

Teaching program

Génie des Procédés et Bio-Procédés

Academic year 2023-2024

Ecole polytechnique de Nantes Université

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Part I

Tables of teaching units

Semester 5 - unit *GPB 3*

Mathematics

ECTS : 4

Manager : COTONNEC Annaig

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|----------------------------|------|-------|----|------|----|-------|------|
| • Worksheets and Databases | 7.5 | 1.25 | 12 | | | 20.75 | 1.5 |
| • Applied mathematics | 15 | 26.25 | | | | 41.25 | 2.5 |
| TOTAL | 22.5 | 27.5 | 12 | 0 | 0 | 62 | |

Biochemistry

ECTS : 2

Manager : COGNE Guillaume

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|----------------------|------|-----|----|------|----|------|------|
| • Biochemistry | 5 | 7.5 | | | | 12.5 | 1 |
| • Enzymatic kinetics | 5 | 7.5 | 8 | | | 20.5 | 1 |
| TOTAL | 10 | 15 | 8 | 0 | 0 | 33 | |

Systemic analysis

ECTS : 3

Manager : COGNE Guillaume

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|--|-------|-------|----|------|----|-------|------|
| • Methods and concepts in (bio)process engineering | 10 | 16.25 | | | | 26.25 | 2 |
| • Systemic analysis | 3.75 | 8.75 | | | | 12.5 | 1 |
| TOTAL | 13.75 | 25 | 0 | 0 | 0 | 38.75 | |

Humanités 1

ECTS : 8

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------|------|----|------|----|------|------|
| • Business knowledge and entrepreneurship | 3 | 13.5 | | | | 4 | 1.3 |
| • Physical education and sport 1 | | 21 | | | | 2 | 1.3 |
| • Professionnal project 1 | 1.5 | 12 | | | | 4.5 | 1.3 |
| • Sustainable development and social responsibility 1 | 1.5 | 13.5 | | | | | 1.3 |
| • Project management 1 | 4.5 | | 3 | | | 2 | 1.3 |
| • Grammar and professional English 1 | | 40 | | | | | 3.5 |
| TOTAL | 10.5 | 100 | 3 | 0 | 0 | 12.5 | |

Accueil différencié

ECTS : 3

Manager : COTONNEC Annaig

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|----------------|------|-----|----|------|----|------|------|
| • Cell biology | | 16 | | | | 16 | 1 |
| • Chemistry | | 16 | | | | 16 | 1 |
| • Mathematics | | 16 | | | | 16 | 1 |
| • Physics | | 16 | | | | 16 | 1 |
| TOTAL | 0 | 64 | 0 | 0 | 0 | 64 | |

Physics

ECTS : 5

Manager : SI-AHMED El-Khider

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------|-------|------|----|------|----|-------|------|
| • Hydraulics | 10 | 17.5 | 16 | | | 37 | 2.5 |
| • Thermodynamics | 13.75 | 22.5 | | | | 37.75 | 2.5 |
| TOTAL | 23.75 | 40 | 16 | 0 | 0 | 74.75 | |

Chemistry

ECTS : 5

Manager : MARCHAL Luc

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|------|------|----|------|----|-------|------|
| • Good laboratory practices 1 | 3.75 | | 8 | | | 11.75 | 0.5 |
| • Solution chemistry | 5 | 6.25 | | | | 11.25 | 1 |
| • Chemistry kinetics | 5 | 8.75 | 8 | | | 21.75 | 1.5 |
| • Thermochemistry | 6.25 | 10 | 8 | | | 24.25 | 2 |
| TOTAL | 20 | 25 | 24 | 0 | 0 | 69 | |

Sum of semester

| | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|-------|-------|----|------|----|------|------|
| Sum | 100.5 | 296.5 | 63 | 0 | 0 | 354 | 30 |
| Face-to-face sum | 460 | | | | | | |

Semester 6 - unit *GPB 3*

Humanités 2

ECTS : 8

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------|-------|----|------|----|------|------|
| • History of organizations and Accounting business game | 9 | 10.5 | 12 | | | 5 | 0.15 |
| • Physical education and sport 2 | | 21 | | | | 2 | 0.15 |
| • Soft skills | | 7.5 | | | | | 0.15 |
| • Socio-economic debates and Tools for shifting | | 21 | | | | 10 | 0.15 |
| • Professional Project 2 | | 4.5 | | | | | 0.05 |
| • Grammar, Toeic and professional English 2 | | 39 | 2 | | | | 0.35 |
| TOTAL | 9 | 103.5 | 14 | 0 | 0 | 17 | |

Separation processes

ECTS : 6

Manager : *MARCHAL Luc*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|----------------------------|------|-------|----|------|----|-------|------|
| • Absorption | 5 | 8.75 | | | | 13.75 | 1 |
| • Adsorption | 2.5 | 3.75 | | | | 5 | 1 |
| • Distillation | 7.5 | 11.25 | 12 | 4 | | 34.75 | 2 |
| • Extraction | 7.5 | 11.25 | 12 | | | 30.75 | 2 |
| • Column process modelling | 5 | | | | | 5 | 0 |
| TOTAL | 27.5 | 35 | 24 | 4 | 0 | 89.25 | |

Transfer phenomena

ECTS : 5

Manager : *SI-AHMED El-Khider*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------|------|-------|----|------|----|------|------|
| • Dimensional analysis | 2.5 | 2.5 | | | | 5 | 0 |
| • Fluid mechanics | 7.5 | 12.5 | | | | 26.5 | 2 |
| • Heat transfert | 10 | 17.5 | | | | 25 | 2 |
| • Mass transfer | 7.5 | 13.75 | | | | 20 | 2 |
| TOTAL | 27.5 | 46.25 | 0 | 0 | 0 | 76.5 | |

Reactors

ECTS : 3

Manager : *GENTRIC Caroline*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------|------|-------|----|------|----|-------|------|
| • Stirring and mixing | 5 | 6.25 | 6 | | | 17.25 | 1 |
| • Homogeneous reactors | 10 | 11.25 | 6 | | | 27.25 | 2 |
| TOTAL | 15 | 17.5 | 12 | 0 | 0 | 44.5 | |

3A Internship

ECTS : 2

Manager : *SI-AHMED El-Khider*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-----------------|------|-----|----|------|----|------|------|
| • 3A Internship | | | | | | | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | |

Biocatalysis and microbiology

ECTS : 3

Manager : *COGNE Guillaume*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|------|------|----|------|----|-------|------|
| • Biocatalysis | 10 | 6.25 | 12 | | | 33.25 | 1.5 |
| • Good laboratory practices 2 | 3.75 | | | | | 3.75 | 0.5 |
| • Microbiology | 6.25 | 1.25 | 12 | | | 24.5 | 1 |
| TOTAL | 20 | 7.5 | 24 | 0 | 0 | 61.5 | |

Numerical tools

ECTS : 3

Manager : *COTONNEC Annaig*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------------|-------|-------|----|------|----|-------|------|
| • Computing methods | 6.25 | 10 | 20 | | | 36.25 | 2 |
| • Statistics and probability | 10 | 11.25 | | | | 21.25 | 1 |
| TOTAL | 16.25 | 21.25 | 20 | 0 | 0 | 57.5 | |

Sum of semester

| | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|--------|-----|----|------|----|--------|------|
| Sum | 115.25 | 231 | 94 | 4 | 0 | 346.25 | 30 |
| Face-to-face sum | 444.25 | | | | | | |

Semester 7 - unit *GPB 4*

Advanced reactors

ECTS : 3

Manager : *GENTRIC Caroline*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|-------|-------|----|------|----|-------|------|
| • Non-ideal reactors modeling | 8.75 | 13.75 | | | | 22.5 | 2 |
| 1 opt { ▷ Photobioreactor | 7.5 | 11.25 | | | | 18.75 | 2 |
| ▷ Heterogeneous reactors | 7.5 | 11.25 | | | | 18.75 | 2 |
| TOTAL | 16.25 | 25 | 0 | 0 | 0 | 41.25 | |

Data Acquisiton and Analysis

ECTS : 5

Manager : *TITICA Mariana*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|------|-------|------|------|----|-------|------|
| • Sensors and Process Control | 7.5 | 8.75 | | 8 | | 24.25 | 2 |
| • Labview | | | 24 | | | 24 | 2 |
| • Design of Experiment | 7.5 | 11.25 | 2.5 | | | 21.25 | 2 |
| TOTAL | 15 | 20 | 26.5 | 8 | 0 | 69.5 | |

Advanced fluid mechanics

ECTS : 4

Manager : *SI-AHMED El-Khider*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------|------|-------|----|------|----|-------|------|
| • Compressible fluids | 3.75 | 6.25 | | | | 10 | 1 |
| • Flow in Porous Media | 8.75 | 15 | | | | 23.75 | 1.5 |
| • Turbulence | 7.5 | 11.25 | | | | 18.75 | 1.5 |
| TOTAL | 20 | 32.5 | 0 | 0 | 0 | 52.5 | |

Humanités 3

ECTS : 7

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|-----------|-------------|----------|----------|----------|-----------|--------|
| • Business analysis | 4.5 | 6 | | | | 3 | 0.15 |
| • Quality, security and environmental approaches (QSE1) | | 3 | 3 | | | | 0.1 |
| • Physical education and sport 3 | | 21 | | | | 2 | 0.1 |
| • Negotiations | 3 | 7.5 | | | | 2 | 0.1 |
| • Professional project 3 | | 6 | | | | 6 | 0.1 |
| • Circular economy | 4.5 | 3 | | | | 6 | 0.1 |
| • Professional English 3 | | 19 | 2 | | | | 0.2625 |
| 1 opt { ▷ Continuous Assessment (bis) | | | | | | | 0.0875 |
| ▷ French as a Foreign Language for engineering students | | 18 | | | | | 0.0875 |
| ▷ Second foreign language - Spanish | | 18 | | | | | 0.0875 |
| ▷ Second foreign language - Japanese | | 18 | | | | | 0.0875 |
| ▷ Second foreign language - Sign language | | 18 | | | | | 0.0875 |
| ▷ Training for Toeic | | 18 | | | | | 0.0875 |
| TOTAL | 12 | 83.5 | 5 | 0 | 0 | 19 | |

Purification and thermal processes

ECTS : 3

Manager : MARCHAL Luc

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|-----------|--------------|----------|----------|----------|--------------|------|
| • Industrial chromatography | 5 | 5 | | | | 10 | 2 |
| • Cristallization | 2.5 | 6.25 | | | | 8.75 | 1 |
| • Heat Exchangers | 2.5 | 6.25 | | | | 8.75 | 1 |
| • Processes with Phase Change | 5 | 11.25 | | | | 16.25 | 2 |
| TOTAL | 15 | 28.75 | 0 | 0 | 0 | 43.75 | |

Process development

ECTS : 6

Manager : MARCHAL Luc

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-----------------------|----------|----------|-----------|----------|----------|-----------|------|
| • Process development | | | 60 | | | 60 | 1 |
| TOTAL | 0 | 0 | 60 | 0 | 0 | 60 | |

Option

ECTS : 2

Manager : CHARGE Pascal

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------------|----------|----------|----------|------------|----------|----------|
| • 3A Internship Assesment | | | | | | | 1 |
| 1-4,5 { ▷ Entrepreneurship S7 | | | | 32 | | | 1 |
| ▷ Transition Engineering and Interdisciplinarity S7 | | | | 32 | | | 1 |
| ▷ Research S7 | | | | 32 | | | 1 |
| ▷ Ecological and Societal Transition S7 | | | | 32 | | | 1 |
| ▷ Low-carbon housing S7 | | | | 32 | | | 1 |
| TOTAL | min | 0 | 0 | 0 | 32 | 0 | 0 |
| | max | 0 | 0 | 0 | 160 | 0 | 0 |

Sum of semester

| | | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|-----|---------------|--------|------|------|----|------|------|
| Sum | min | 78.25 | 189.75 | 91.5 | 40 | 0 | 286 | 30 |
| | max | 78.25 | 189.75 | 91.5 | 168 | 0 | 286 | |
| Face-to-face sum | | 399.5 à 527.5 | | | | | | |

Semester 8 - unit *GPB 4*

Water treatment

ECTS : 2

Manager : MASSE Anthony

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------------------|------|------|----|------|----|-------|------|
| • Potable Water Treatment & Design | 3.75 | 7.5 | | | | 11.25 | 1 |
| • Membrane and Granular Separation | 6.25 | 10 | | | | 16.25 | 2 |
| TOTAL | 10 | 17.5 | 0 | 0 | 0 | 27.5 | |

Biological Reaction Engineering

ECTS : 2

Manager : COGNE Guillaume

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|----------------------------|-------|------|----|------|----|-------|------|
| • Kinetics in bioprocesses | 8.75 | 12.5 | | | | 21.25 | 2 |
| • Fermentaton engineering | 3.75 | 7.5 | | | | 11.25 | 1 |
| • Enzymatic reactors | 3.75 | 7.5 | | | | 11.25 | 1 |
| TOTAL | 16.25 | 27.5 | 0 | 0 | 0 | 43.75 | |

Advanced system analysis

ECTS : 4

Manager : SI-AHMED El-Khider

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|------------------------|------|------|----|------|----|------|------|
| • Numerical analysis | 6.25 | 6.25 | 24 | | | 36.5 | 2 |
| • Bibliography Project | 2.5 | | 4 | 30 | | 36.5 | 2 |
| TOTAL | 8.75 | 6.25 | 28 | 30 | 0 | 73 | |

Humanités 4

ECTS : 6

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------|------|----|------|----|------|-------|
| • Critical approaches of the firm | | 9 | | | | 3 | 0.13 |
| • Quality, security ant environmental approaches (QSE2) | | 6 | | | | | 0.13 |
| • Physical education and sport 4 | | 19.5 | | | | 2 | 0.13 |
| • Professional Project 4 | | 12 | | | | 5 | 0.13 |
| • Sustainable development and social responsibility 2 | | 9 | | | | 10 | 0.13 |
| • Intercultural explorations | | 18 | | | | | 0.175 |
| 1 ^{opt} { ▷ Continuous Assessment(bis) | | | | | | | 0.175 |
| ▷ French as a Foreign Language for engineering students | | 18 | | | | | 0.175 |
| ▷ Second foreign language - Sign language | | 18 | | | | | 0.175 |
| ▷ Second foreign language - Spanish | | 18 | | | | | 0.175 |
| ▷ Second foreign language - Japanese | | 18 | | | | | 0.175 |
| ▷ Training for Toeic | | 18 | | | | | 0.175 |
| TOTAL | 0 | 91.5 | 0 | 0 | 0 | 20 | |

4A Internship

ECTS : 5

Manager : COGNE Guillaume

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-----------------|------|-----|----|------|----|------|------|
| • 4A Internship | | | | | | | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | |

Option

ECTS : 2

Manager : CHARGE Pascal

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------|-----|----|------|----|------|------|
| I opt { ▷ Entrepreneurship S8 ▷ Transition Engineering and Interdisci- plinarity S8 ▷ Research S8 ▷ Ecological and Societal Transition S8 ▷ Low-carbon housing S8 | | | | 32 | | | 1 |
| | | | | 32 | | | 1 |
| | | | | 32 | | | 1 |
| | | | | 32 | | | 1 |
| | | | | 32 | | | 1 |
| TOTAL | 0 | 0 | 0 | 32 | 0 | 0 | |

Non-newtonian fluids

ECTS : 2

Manager : SI-AHMED El-Khider

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---------------------------|------|-------|----|------|----|-------|------|
| • Complex fluid mechanics | 3.75 | 8.75 | | | | 12.5 | 1 |
| • Rheology | 3.75 | 5 | | | | 8.75 | 1 |
| TOTAL | 7.5 | 13.75 | 0 | 0 | 0 | 21.25 | |

Industrial process design

ECTS : 2

Manager : MARCHAL Luc

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---------------------|------|-------|----|------|----|-------|------|
| • Industrial design | 10 | 15 | | | | 25 | 2 |
| • Process safety | 7.5 | 6.25 | | | | 13.75 | 1 |
| TOTAL | 17.5 | 21.25 | 0 | 0 | 0 | 38.75 | |

Bioprocess development

ECTS : 5

Manager : COGNE Guillaume

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|--------------------------|------|-----|----|------|----|------|------|
| • Bioprocess development | | | 60 | | | 60 | 1 |
| TOTAL | 0 | 0 | 60 | 0 | 0 | 60 | |

Sum of semester

| | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|--------|--------|----|------|----|--------|------|
| Sum | 60 | 177.75 | 88 | 62 | 0 | 284.25 | 30 |
| Face-to-face sum | 387.75 | | | | | | |

Semester 9 - unit *GPB 5*

Process control and command

ECTS : 5

Manager : *TITICA Mariana*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|------|------|----|------|----|-------|------|
| • Process control and command | 25 | 1.25 | 21 | | | 47.25 | 3 |
| • Project | | | | 9 | | 9 | 2 |
| TOTAL | 25 | 1.25 | 21 | 9 | 0 | 56.25 | |

Engineer's project

ECTS : 7

Manager : *MARCHAL Luc*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-----------------------|------|-----|----|------|----|------|------|
| • Evaluation stage 4A | | | | | | | 1 |
| • Engineering project | 5 | 99 | | | | 100 | 5 |
| TOTAL | 5 | 99 | 0 | 0 | 0 | 100 | |

Eco-design

ECTS : 7

Manager : *COTONNEC Annaig*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---|------|-------|----|------|----|------|------|
| • Life cycle analysis | 8.75 | 3.75 | 6 | | | 17 | 1 |
| • Process Energy Management | 8.75 | 9.5 | | | | 17 | 1 |
| ^{1 opt} { ▷ Industrial Biotechnology | 20 | | | | | 20 | 0 |
| ▷ Intensified processes | 20 | | | | | 20 | 0 |
| TOTAL | 37.5 | 13.25 | 6 | 0 | 0 | 54 | |

Process modeling

ECTS : 7

Manager : *SI-AHMED El-Khider*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|--|------|------|------|------|----|------|------|
| • Computational fluid dynamics | 15 | 19 | | 15 | | 45 | 2 |
| ^{1 & 2} { ▷ Thermodynamic model | 2.5 | 2.5 | 5 | | | 10 | 1 |
| ▷ ProSim | 5 | 9 | 8 | 16 | | 34 | 1 |
| ▷ SuperPro Designer | 7.5 | 11.5 | 13 | 16 | | 44 | 2 |
| TOTAL | min | 17.5 | 25.5 | 5 | 31 | 0 | 55 |
| | max | 27.5 | 39.5 | 21 | 47 | 0 | 123 |

Humanités 5

ECTS : 4

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---------------------------------------|------|------|------|------|----|------|------|
| • Designing the tomorrow's management | 3 | 6 | | | | 3 | 0.3 |
| • Project management 2 | | 15 | | | | 3 | 0.35 |
| • People and team management | | 10.5 | | | | 6 | 0.3 |
| • Professional project 5 | | 12 | | | | 2 | 0.05 |
| ▷ Training for TOEIC - s9 | | 10 | | | | | 0 |
| TOTAL | min | 3 | 43.5 | 0 | 0 | 0 | 14 |
| | max | 3 | 53.5 | 0 | 0 | 0 | 14 |

Sum of semester

| | | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|-----|---------------|-------|----|------|----|--------|------|
| Sum | min | 88 | 182.5 | 32 | 40 | 0 | 279.25 | 30 |
| | max | 98 | 206.5 | 48 | 56 | 0 | 347.25 | |
| Face-to-face sum | | 322.5 à 408.5 | | | | | | |

Semester 9 - unit *GPB5 PRO*

Process control and command

ECTS : 5

Manager : *TITICA Mariana*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|-------------------------------|------|------|----|------|----|-------|------|
| • Process control and command | 25 | 1.25 | 21 | | | 47.25 | 3 |
| • Project | | | | 9 | | 9 | 2 |
| TOTAL | 25 | 1.25 | 21 | 9 | 0 | 56.25 | |

Eco-design

ECTS : 7

Manager : *COTONNEC Annaig*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|--|------|-------|----|------|----|------|------|
| • Life cycle analysis | 8.75 | 3.75 | 6 | | | 17 | 1 |
| • Process Energy Management | 8.75 | 9.5 | | | | 17 | 1 |
| $\left. \begin{array}{l} \triangleright \text{Industrial Biotechnology} \\ \triangleright \text{Intensified processes} \end{array} \right\} 1 \text{ opt}$ | 20 | | | | | 20 | 0 |
| | 20 | | | | | 20 | 0 |
| TOTAL | 37.5 | 13.25 | 6 | 0 | 0 | 54 | |

Process modeling

ECTS : 7

Manager : *SI-AHMED El-Khider*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|--|----------|------|----|------|----|------|------|
| • Computational fluid dynamics | 15 | 19 | | 15 | | 45 | 2 |
| $\left. \begin{array}{l} \triangleright \text{Thermodynamic model} \\ \triangleright \text{ProSim} \\ \triangleright \text{SuperPro Designer} \end{array} \right\} 1 \text{ à } 2$ | 2.5 | 2.5 | 5 | | | 10 | 1 |
| | 5 | 9 | 8 | 16 | | 34 | 1 |
| | 7.5 | 11.5 | 13 | 16 | | 44 | 2 |
| TOTAL | min 17.5 | 25.5 | 5 | 31 | 0 | 55 | |
| | max 27.5 | 39.5 | 21 | 47 | 0 | 123 | |

Engineering project PRO

ECTS : 7

Manager : *MARCHAL Luc*

| Course | Lect | Tut | PW | Proj | WP | Asst | Coef |
|---------------------------|------|-----|----|------|----|------|------|
| • Evaluation stage 4A | | | | | | | 1 |
| • Engineering project PRO | 5 | 79 | | | | 80 | 5 |
| TOTAL | 5 | 79 | 0 | 0 | 0 | 80 | |

Sum of semester

| | | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|-----|-----------|-----|----|------|----|--------|------|
| Sum | min | 85 | 119 | 32 | 40 | 0 | 245.25 | 26 |
| | max | 95 | 133 | 48 | 56 | 0 | 313.25 | |
| Face-to-face sum | | 256 à 332 | | | | | | |

Semester 10 - unit *GPB 5*

Stage Ingénieur

ECTS : 30

| Course | Lect | Tut | PW | Proj | WP | Asst | <i>Coef</i> |
|-----------------|------|-----|----|------|----|------|-------------|
| • Final project | | | | | | | <i>40</i> |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | |

Sum of semester

| | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|------|-----|----|------|----|------|------|
| Sum | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| Face-to-face sum | | | | | | | |

Semester 10 - unit *GPB5 PRO*

Final project PRO

ECTS : 30

| Course | Lect | Tut | PW | Proj | WP | Asst | <i>Coef</i> |
|---------------------|------|-----|----|------|----|------|-------------|
| • Final project PRO | | | | | | | <i>40</i> |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | |

Sum of semester

| | Lect | Tut | PW | Proj | WP | Asst | ECTS |
|------------------|------|-----|----|------|----|------|------|
| Sum | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| Face-to-face sum | | | | | | | |

Part II

Sheets of courses

3A Internship

Hours

Lect Tut PW Proj WP Asst

Evaluation

2 evaluations :

- *Autoeval*
- *Rapport*

Manager : El-Khider SI-AHMED

3A Internship Assesment

Hours

Lect Tut PW Proj WP Asst

Evaluation

One evaluation : *Rapport*

Manager : Bruno AUVITY

4A Internship

Hours

Lect Tut PW Proj WP Asst

Evaluation

One evaluation : *autoeval*

Manager : Guillaume COGNE

Absorption

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 5 | 8.75 | | | | 13.75 |

Evaluation

One evaluation : *Examen*

Manager : Walid BLEL

Adsorption

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 2.5 | 3.75 | | | | 5 |

Evaluation

One evaluation : *Examen*

Manager : Walid BLEL

Applied mathematics

Hours

| | | | | | |
|------|-------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 15 | 26.25 | | | | 41.25 |

Evaluation

2 evaluations :

- *Contrôle continu 1*
- *Contrôle continu 2*

Bibliography

Soum, Jagut, Dubouix, techniques mathématiques pour la physique, travaux dirigés, volumes 1 et 2, Hachette supérieur, 1995.

Kaddour NAJIM, Enso IKONEN, Outils mathématiques pour le génie des procédés, cours et exercices corrigés, Dunod, 1999.

François LIRET, Maths en pratique à l'usage des étudiants, cours et exercices , Dunod, 2006.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Maîtrise des notions mathématiques utiles en Génie des procédés | · | · | ✓ | · | · |
| • Avoir la capacité d'interpréter et d'analyser les informations données et de les traduire en problèmes mathématiques, de vérifier les résultats | · | ✓ | · | · | · |

Manager : Annaig COTONNEC

Bibliography Project

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 2.5 | | 4 | 30 | | 36.5 |

Evaluation

One evaluation : *Rapport biblio*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Intégration des contraintes et des connaissances pour élaborer une solution technique | . | ✓ | . | . | . |
| • Rédaction de livrables, synthèse de résultats et argumentation de la solution choisie | . | . | ✓ | . | . |
| • Elaboration d'une démarche expérimentale de validation des choix | . | ✓ | . | . | . |

Manager : *El-Khider SI-AHMED*

Biocatalysis

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 10 | 6.25 | 12 | | | 33.25 |

Evaluation

One evaluation : *Examen*

Manager : Guillaume COGNE

Biochemistry

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 5 | 7.5 | | | | 12.5 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Bibliography

M. Larpent-Gourgaud, J.J. Sanglier: Biotechnologie - Principes et méthodes, 1992, Doin Editeurs.

J. Brock, M.T. Madigan, J.M. Martinko and J. Parker: Biology of micro-organisms, 9th edition, 2000.

A.L. Lehninger, D.L. Nelson, M.M. Cox: Principes de Biochimie, 1993, Flammarion.

J. Darnell, H. Lodish, D. Baltimore, De Boeck-Westmael: Biologie moléculaire de la cellule, 1993, 2e éd.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Expérience du travail en (micro)-biologie intégrant les bonnes pratiques de laboratoire (BPL) | · | ✓ | · | · | · |
| • Connaissance générale des approches méthodologiques appliquée à la biologie | ✓ | · | · | · | · |
| • Maîtrise des techniques d'isolement et caractérisation de micro-organismes d'intérêt industriel | · | · | ✓ | · | · |

Manager : Guillaume COGNE

Bioprocess development

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | | 60 | | | 60 |

Evaluation

2 evaluations :

- *Rapport projet*
- *Oral projet*

Manager : Guillaume COGNE

Business analysis

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 4.5 | 6 | | | | 3 |

Evaluation

One evaluation : *Etude de cas*

Bibliography

- A de Baynast, J Lendrevie, J Levy; Mercator"; Dunod. Dernières éditions
- F Canart ; Management de la qualité ; Gualino L Extenso Editions
- Henri Mintzberg, Structure et dynamique des organisations (Éd. d'organisation)
- M.Crozier ; A quoi sert la sociologie des organisations (Éd. Seli Arslan)
- S. Robbins, D. DeCenzo, M. Coulter ; Management, l'essentiel des concepts et des pratiques (9ème éd) Ed. Pearson
- <https://www.l-expert-comptable.com/dossiers/evaluer-l-entreprise-reprendre-grace-l-analyse-economique.html>
- <https://www.fao.org/capacity-development/resources/practical-tools/analyse-organizational-performance/fr/>

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |

Manager : Gwenael THOREL

Business knowledge and entrepreneurship

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 3 | 13.5 | | | | 4 |

Evaluation

One evaluation : *Etude de cas*

Bibliography

? Cyr, A. (2009). Les représentations entrepreneuriales, sous la direction de Louis Jacques Filion et Christian Bourion, Paris, Eska, 2008, 262 p. Revue internationale PME Économie et gestion de la petite et moyenne entreprise, 22(3-4), 174-176.

? Henri Mintzberg, Structure et dynamique des organisations (Éd. d'organisation)

? <http://www.laurentdehouck.fr/enseignements/histoire-des-idees-sur-les-organisations/>

? M. Bidan et Y. Livian (2022), les grands auteurs aux frontières du management (Editions EMS)

? M. Crozier ; A quoi sert la sociologie des organisations (Éd. Seli Arslan)

? Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying business models: Origins, present, and future of the concept. Communications of the association for Information Systems, 16(1), 1.

? Ramadani, V. (2009). Business angels: who they really are. Strategic Change: Briefings in Entrepreneurial Finance, 18(7?8), 249-258.

? S. Robbins, D. DeCenzo, M. Coulter ; Management, l'essentiel des concepts et des pratiques Ed. Pearson.

? Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Academy of management Review, 26(2), 243-263.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |

Manager : Luc OILI

Cell biology

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 16 | | | | 16 |

Evaluation

2 evaluations :

- *CC*
- *Un contrôle*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Comprehensive knowledge of methodological approaches applied to biology | ✓ | . | . | . | . |

Manager : Guillaume COGNE

Chemistry

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 16 | | | | 16 |

Evaluation

2 evaluations :

- *Contrôle*
- *Projet: Orale*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Learn the basics of mineral and organic chemistry | ✓ | . | . | . | . |
| • Identify modes of material chemical transformation on an industrial scale. | ✓ | . | . | . | . |

Manager : Luc MARCHAL

Chemistry kinetics

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 5 | 8.75 | 8 | | | 21.75 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Agnès MONTILLET

Circular economy

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 4.5 | 3 | | | | 6 |

Evaluation

One evaluation : *Diagnostic*

Bibliography

- AUREZ Vincent, GEORGEAULT Laurent, Economie circulaire, de Boeck
- Cf bibliographie donnée pendant le cours

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-3 | ✓ | . | . | . | . |

Manager : Chrystèle GONCALVES

Complex fluid mechanics

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 3.75 | 8.75 | | | | 12.5 |

Evaluation

One evaluation : *Examen*

Manager : El-Khider SI-AHMED

Compressible fluids

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 3.75 | 6.25 | | | | 10 |

Evaluation

One evaluation : *Examen*

Manager : Luc MARCHAL

Computational fluid dynamics

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 15 | 19 | | 15 | | 45 |

Evaluation

3 evaluations :

- *Rapport projet CFD*
- *Soutenance CFD*
- *CC*

Manager : Jeremy PRUVOST

Computing methods

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 6.25 | 10 | 20 | | | 36.25 |

Evaluation

One evaluation : *Examen*

Manager : Djamel ZIANE

Continuous Assessment (bis)

Hours

Lect Tut PW Proj WP Asst

Evaluation

One evaluation : *CC*

Continuous Assessment(bis)

Hours

Lect Tut PW Proj WP Asst

Evaluation

One evaluation : *CC*

Cristallization

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 2.5 | 6.25 | | | | 8.75 |

Evaluation

2 evaluations :

- *Projet*
- *Examen*

Manager : Walid BLEL

Critical approaches of the firm

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 9 | | | | 3 |

Evaluation

One evaluation : *Exposé*

Bibliography

- Carney, B. M., & Getz, I. (2016). Freedom, Inc: How Corporate Liberation Unleashes Employee Potential and Business Performance. International Creative Management.
- Detchessahar, M. (2019). L'entreprise délibérée: refonder le management par le dialogue. Nouvelle cité.
- Dujarier, M.-A. (2017). Le management désincarné: enquête sur les nouveaux cadres du travail. La découverte.
- Gomez, P.-Y. (2013). Le travail invisible: enquête sur une disparition. Paris: F. Bourin.
- Les statuts juridiques de l'entreprise (Dessine-moi l'éco)
- Rendre le travail visible : la solution pour sortir de la crise (Dessine moi l'éco)

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |

Manager : Roland BESSENEY

Design of Experiment

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|-----|------|----|-------|
| 7.5 | 11.25 | 2.5 | | | 21.25 |

Evaluation

One evaluation : *Examen*

Manager : Annaig COTONNEC

Designing the tomorrow's management

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 3 | 6 | | | | 3 |

Evaluation

One evaluation : *Grille d'évaluation*

Bibliography

Partie don :

L'entreprise une affaire de don (Collectif, 2016)

Recevoir pour donner (Collectif, 2016)

Partie Jeux sérieux :

Theory of Fun for Game Design, Raph Koster, O'Reilly Media; Second edition, ISBN ? 978-1449363215

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | . | ✓ | . | . |
| • TPN-2 | . | . | ✓ | . | . |
| • TPN-3 | . | . | ✓ | . | . |
| • TPN-4 | . | . | ✓ | . | . |
| • TPN-5 | . | . | ✓ | . | . |

Manager : Roland BESSENEY

Distillation

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 7.5 | 11.25 | 12 | 4 | | 34.75 |

Evaluation

2 evaluations :

- *CC*
- *TP*

Manager : Luc MARCHAL

Ecological and Societal Transition S7

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | | | 32 |

Evaluation

One evaluation : *Evaluation*

Manager : Emilie GADOIN

Ecological and Societal Transition S8

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | | | 32 |

Evaluation

One evaluation : *Evaluation*

Manager : Emilie GADOIN

Engineering project

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 5 | 99 | | | | 100 |

Evaluation

4 evaluations :

- *Autoevaluation*
- *Rapport*
- *Soutenance*
- *Gestion*

Manager : Luc MARCHAL

Engineering project PRO

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 5 | 79 | | | | 80 |

Evaluation

3 evaluations :

- *Autoeval*
- *Rapport*
- *Soutenance*

Manager : Luc MARCHAL

Entrepreneurship S7

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : John KINGSTON

Entrepreneurship S8

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : John KINGSTON

Enzymatic kinetics

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 5 | 7.5 | 8 | | | 20.5 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Bibliography

Enfors, S.O. & Häggström, L. 2000. Bioprocess Technology. Fundamentals and Applications. Stockholm, Sweden. For the simulation practicals: Computer programme: Fermentation. A Practical approach series. PSI Computer programme, Boza Automatisering BV, Nuenen, NL

Atkinson B and F Mavituna, 1991 Biochemical Engineering & Biotechnology Handbook, Macmillan Publishers, 2nd edition.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Connaître les principes et les pratiques en génie biochimique et génie microbiologique | · | · | ✓ | · | · |
| • Connaître les différentes cinétiques de production de biomasse et métabolites, de consommation de substrats, les réactions de maintenance et mort cellulaire pour quantifier et modéliser des cinétiques de croissance cellulaire ou des cinétiques enzymatiques | ✓ | · | · | · | · |
| • Maîtrise de la méthodologie d'analyse stoechiométrique des réactions biologiques en bioréacteurs | · | ✓ | · | · | · |

Manager : Guillaume COGNE

Enzymatic reactors

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 3.75 | 7.5 | | | | 11.25 |

Evaluation

One evaluation : *Examen*

Manager : Agnès MONTILLET

Evaluation stage 4A

Hours

Lect Tut PW Proj WP Asst

Evaluation

One evaluation : *Rapport*

Manager : Walid BLEL

Extraction

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 7.5 | 11.25 | 12 | | | 30.75 |

Evaluation

3 evaluations :

- *CC*
- *Dossier*
- *TP*

Manager : Luc MARCHAL

Fermentaton engineering

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 3.75 | 7.5 | | | | 11.25 |

Evaluation

One evaluation : *Examen*

Manager : Guillaume COGNE

Final project

Hours

Lect Tut PW Proj WP Asst

Evaluation

3 evaluations :

- *Manuscrit*
- *Soutenance*
- *Éval entreprise*

Manager : Annaig COTONNEC

Final project PRO

Hours

Lect Tut PW Proj WP Asst

Evaluation

3 evaluations :

- *Manuscrit*
- *Soutenance*
- *Éval entreprise*

Manager : Annaig COTONNEC

Flow in Porous Media

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 8.75 | 15 | | | | 23.75 |

Evaluation

3 evaluations :

- *Examen*
- *CC*
- *TP/projet*

Manager : Nour-Eddine SABIRI

Fluid mechanics

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 7.5 | 12.5 | | | | 26.5 |

Evaluation

3 evaluations :

- *CC*
- *Examen*
- *TP*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Connaissance des approches avancées de type analyse locale (restreinte ici aux écoulements laminaires) | · | ✓ | · | · | · |
| • Application de bilans (masse, énergie, quantité de mouvement) aux échelles macroscopiques (obtention de théorèmes intégraux) | · | · | ✓ | · | · |
| • Application de bilans (masse, énergie, quantité de mouvement) aux échelles microscopiques (obtention d'équations locales de conservation) | · | · | ✓ | · | · |

Manager : El-Khider SI-AHMED

French as a Foreign Language for engineering students

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

French as a Foreign Language for engineering students

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Good laboratory practices 1

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 3.75 | | 8 | | | 11.75 |

Evaluation

One evaluation : *TP*

Manager : Sandrine GRATTIER

Good laboratory practices 2

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 3.75 | | | | | 3.75 |

Evaluation

One evaluation : *TP*

Manager : Sandrine GRATIER

Grammar and professional English 1

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 40 | | | | |

Evaluation

2 evaluations :

- *CC*
- *DS*

Grammar, Toeic and professional English 2

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 39 | 2 | | | |

Evaluation

3 evaluations :

- *CC*
- *Tutorat*
- *Toeic*

Heat Exchangers

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 2.5 | 6.25 | | | | 8.75 |

Evaluation

2 evaluations :

- *Examen*
- *CC*

Manager : El-Khider SI-AHMED

Heat transfert

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 10 | 17.5 | | | | 25 |

Evaluation

2 evaluations :

- *CC*
- *Examen*

Manager : El-Khider SI-AHMED

Heterogeneous reactors

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 7.5 | 11.25 | | | | 18.75 |

Evaluation

2 evaluations :

- *Examen*
- *Projet*

Manager : Luc MARCHAL

History of organizations and Accounting business game

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 9 | 10.5 | 12 | | | 5 |

Evaluation

One evaluation : *Soutenance + CC*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | . | ✓ | . | . | . |

Manager : Chrystèle GONCALVES

Homogeneous reactors

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 10 | 11.25 | 6 | | | 27.25 |

Evaluation

3 evaluations :

- *Examen*
- *TP*
- *CC*

Manager : Caroline GENTRIC

Hydraulics

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 10 | 17.5 | 16 | | | 37 |

Evaluation

3 evaluations :

- *Examen*
- *TP*
- *CC*

Manager : Annaig COTONNEC

Industrial Biotechnology

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 20 | | | | | 20 |

Evaluation

One evaluation : *Examen écrit*

Industrial chromatography

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 5 | 5 | | | | 10 |

Evaluation

2 evaluations :

- *Projet*
- *Examen*

Manager : Luc MARCHAL

Industrial design

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 10 | 15 | | | | 25 |

Evaluation

One evaluation : *CC*

Manager : Luc MARCHAL

Intensified processes

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 20 | | | | | 20 |

Evaluation

One evaluation : *Projet*

Manager : Luc MARCHAL

Intercultural explorations

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Kinetics in bioprocesses

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 8.75 | 12.5 | | | | 21.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP/Projet*

Manager : Agnès MONTILLET

Labview

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | | 24 | | | 24 |

Evaluation

One evaluation : *Examen*

Manager : Hélène MAREC

Life cycle analysis

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 8.75 | 3.75 | 6 | | | 17 |

Evaluation

One evaluation : *Projet*

Manager : Luc MARCHAL

Low-carbon housing S7

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : Nabil ISSAADI

Low-carbon housing S8

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : Nabil ISSAADI

Mass transfer

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|------|
| 7.5 | 13.75 | | | | 20 |

Evaluation

2 evaluations :

- *CC*
- *Examen*

Manager : El-Khider SI-AHMED

Mathematics

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 16 | | | | 16 |

Evaluation

2 evaluations :

- *CC*
- *Un contrôle*

Bibliography

K. NAJIM, E. IKONEN, Outils mathématiques pour le génie des procédés, cours et exercices corrigés, Dunod, 1999.

K. Weltner, J. Grosjean, W.-J. Weber, P. Schuster, Mathématiques pour les physiciens et les ingénieurs, De Boeck Supérieur, 2012.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Ability to interpret and analyze information and express it in mathematical problems | ✓ | · | · | · | · |
| • Know to use engineering mathematical tools | · | ✓ | · | · | · |
| • Understand relevant mathematical concepts in process engineering | · | ✓ | · | · | · |

Manager : Annaig COTONNEC

Membrane and Granular Separation

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 6.25 | 10 | | | | 16.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Anthony MASSE

Methods and concepts in (bio)process engineering

Hours

| | | | | | |
|------|-------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 10 | 16.25 | | | | 26.25 |

Evaluation

2 evaluations :

- *CC*
- *Examen*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Maîtrise des connaissances générales nécessaires à la compréhension et à la mise en oeuvre d'un procédé | . | . | ✓ | . | . |
| • Etre capable d'appliquer les lois de conservation de la matière à des opérations utiles en chimie et biochimie industrielles | . | ✓ | . | . | . |

Manager : Guillaume COGNE

Microbiology

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 6.25 | 1.25 | 12 | | | 24.5 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Guillaume COGNE

Negotiations

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 3 | 7.5 | | | | 2 |

Evaluation

One evaluation : *Vidéo*

Bibliography

Stimec A. ; « La négociation » ; Dunod

Fisher, Ury ; « Comment réussir une négociation » ; Seuil

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |

Manager : John KINGSTON

Non-ideal reactors modeling

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|------|
| 8.75 | 13.75 | | | | 22.5 |

Evaluation

3 evaluations :

- *TP/Projet*
- *Examen écrit*
- *CC*

Manager : Caroline GENTRIC

Numerical analysis

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 6.25 | 6.25 | 24 | | | 36.5 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Résolution des systèmes linéaires | . | . | ✓ | . | . |
| • Posséder les principaux algorithmes de résolution utilisés en Génie des Procédés | . | . | ✓ | . | . |
| • Résolution des équations aux dérivées partielles | . | . | ✓ | . | . |

Manager : El-Khider SI-AHMED

People and team management

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 10.5 | | | | 6 |

Evaluation

One evaluation : *DS*

Bibliography

- Le chaos Management / Tom Peters / Interditions
 - Manager dans la complexité / Dominique Genelot / Insep Editions
 - Les responsables porteurs de sens / Vincent Lenhardt / Insep Editions
 - De la performance à l'excellence / Jim Collins / Village Mondial
 - Comment leur dire / Gérard Collignon / Interditions
 - Communiquer, motiver, manager en personne/ Taibi Kahler / Interditions
 - Vidéos d'Edgar Morin sur la complexité / Youtube
 - Management et communication : 100 exercices / Denis Cristol / ESF editeur

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | ✓ | . | . | . | . |
| • TPN4 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |

Manager : Anouk GREVIN

Photobioreactor

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 7.5 | 11.25 | | | | 18.75 |

Evaluation

One evaluation : *Examen*

Manager : Jeremy PRUVOST

Physical education and sport 1

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 21 | | | | 2 |

Evaluation

One evaluation : *Contrôle continu*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-7 | ✓ | . | . | . | . |
| • TPN-12 | ✓ | . | . | . | . |
| • TPN-19 | ✓ | . | . | . | . |

Manager : Jérôme BEZIER

Physical education and sport 2

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 21 | | | | 2 |

Evaluation

One evaluation : *Contrôle continu*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-7 | ✓ | . | . | . | . |
| • TPN-12 | ✓ | . | . | . | . |
| • TPN-19 | ✓ | . | . | . | . |

Manager : Jérôme BEZIER

Physical education and sport 3

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 21 | | | | 2 |

Evaluation

One evaluation : *Contrôle continu*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |

Manager : Jérôme BEZIER

Physical education and sport 4

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 19.5 | | | | 2 |

Evaluation

One evaluation : *Contrôle continu*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |

Manager : Jérôme BEZIER

Physics

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 16 | | | | 16 |

Evaluation

2 evaluations :

- *CC*
- *Contrôle*

Bibliography

Alonson / Finn Physique générale

Mick O'Hare « Comment fossiliser son hamster » Editions du Seuil 2008

Yakov Perelman « Oh la Physique ! » Dunod 2000

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Identify the physical quantities governing a problem | ✓ | · | · | · | · |
| • Be familiar with the dimensions of physical quantities and ensure dimensional homogeneity | · | ✓ | · | · | · |

Manager : El-Khider SI-AHMED

Potable Water Treatment & Design

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 3.75 | 7.5 | | | | 11.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Matthieu FRAPPART

ProSim

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 5 | 9 | 8 | 16 | | 34 |

Evaluation

One evaluation : *Projet*

Manager : El-Khider SI-AHMED

Process Energy Management

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 8.75 | 9.5 | | | | 17 |

Evaluation

One evaluation : *Examen*

Manager : Annaig COTONNEC

Process control and command

Hours

| | | | | | |
|------|------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 25 | 1.25 | 21 | | | 47.25 |

Evaluation

One evaluation : *Examen*

Bibliography

Manuels utilisateur des logiciels Matlab-Simulink

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Connaître les différentes méthodes pour le contrôle, la simulation et la commande de procédés biologiques, physiques, ou chimiques | · | · | ✓ | · | · |
| • Formation aux outils et méthodes nécessaires à la conduite des procédés : acquisition, automatisme, observateurs, modélisation et optimisation par simulation | · | ✓ | · | · | · |
| • Etre capable de mettre en place une simulation de procédé à l'aide du logiciel Matlab®-Simulink® | · | ✓ | · | · | · |

Manager : Mariana TITICA

Process development

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | | 60 | | | 60 |

Evaluation

2 evaluations :

- *Rapport projet*
- *Oral projet*

Manager : Luc MARCHAL

Process safety

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 7.5 | 6.25 | | | | 13.75 |

Evaluation

One evaluation : *CC*

Manager : Luc MARCHAL

Processes with Phase Change

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 5 | 11.25 | | | | 16.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP/projet*

Manager : Walid BLEL

Professional English 3

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 19 | 2 | | | |

Evaluation

3 evaluations :

- *CC*
- *Tutorat*
- *DS*

Professional Project 2

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 4.5 | | | | |

Evaluation

One evaluation : *CV rendu*

Manager : Sylvaine GAUTIER

Professional Project 4

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 12 | | | | 5 |

Evaluation

One evaluation : *Oral*

Outline

Path : 4 sessions of 3h TD

1 / Portfolio "Exploration Project Professional" : my "professionnel journey" those last years - changes - choices - motivations...

2 / My professional project : what I intended, the way to go, anticipate steps (especially the choice of option at the end of the fourth year)

3 and 4 / I introduce myself, my skills, my project : simulations and role plays

Goals

Clarify the professional project and be able to present it orally in different circumstances (professional network meetings, hiring individual or collective interview , student lounge, video resume, ..)

Bibliography

"Le Carnet de Route universitaire et professionnel" - SUIO de l'Université de Nantes - 2008

Prerequisites

Professional project 1 (S5)

Discovery of firms and professions (S6)

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | ✓ | . | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-5 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |
| • TPN-7 | ✓ | . | . | . | . |

Manager : Sylvaine GAUTIER

Professional project 3

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 6 | | | | 6 |

Evaluation

One evaluation : *Profil linkedin+rdv*

Bibliography

Grant : Givers & Takers TED

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-2 | . | . | ✓ | . | . |
| • TPN-6 | . | ✓ | . | . | . |
| • TPN-7 | . | ✓ | . | . | . |

Manager : John KINGSTON

Professional project 5

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 12 | | | | 2 |

Evaluation

One evaluation : *Présence*

Bibliography

Ressources : Évolueront selon les thématiques choisies par les intervenants - en lien avec les TPN et les objectifs de ce module.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | ✓ | . | . | . | . |
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-5 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |
| • TPN-7 | ✓ | . | . | . | . |

Manager : Sylvaine GAUTIER

Professional project 1

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 1.5 | 12 | | | | 4.5 |

Evaluation

One evaluation : *Contrôle continu*

Bibliography

- DE LASSUS René, L'analyse transactionnelle : une méthode révolutionnaire pour bien se connaître et mieux communiquer, Marabout (Savoir pratique n3516), 2013, 288 p., ISBN 2501085493
 - DE LASSUS René, La communication efficace par la PNL, Marabout (Bien-être - Psy), 2019, 288 p., ISBN 2501089499
 - DE LASSUS René, L'ennéagramme : les 9 types de personnalités, Marabout (Poche Psy n3568), 2019, 288 p., ISBN 2501084950
 - DE MONICAULT Frédéric / RAVARD Olivier, 100 questions posées à l'entretien d'embauche, Jeunes Editions (Guides J), 2004 (3e édition), 182 p., ISBN-10 : 2844724221 / ISBN-13 : 978-2844724229
 - LEONARD Thomas J., The portable coach, Simon & SCHUSTER, 1999, 336 p., ISBN-10 : 0684850419 / ISBN-13 : 9780684850412
 - ROSENBERG Marshall B., Les mots sont des fenêtres (ou bien ce sont des murs) : initiation à la communication non-violente, La Découverte, 2016, 320 p., ISBN 2707188794
 - www.16personalities.com
 - www.acnv.com

Learning outcomes

| | N | A | M | E | O |
|---------|---|---|---|---|---|
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-6 | . | ✓ | . | . | . |

Manager : Sylvaine GAUTIER

Project

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 9 | | 9 |

Evaluation

One evaluation : *Projet*

Manager : Mariana TITICA

Project management 1

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 4.5 | | 3 | | | 2 |

Evaluation

One evaluation : *DS*

Project management 2

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 15 | | | | 3 |

Evaluation

One evaluation : *Contrôle continu*

Bibliography

Partie analyse du travail : PIERRE VERMERSCH, 1994 « L'entretien d'explicitation », ESF éditeur

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | . | ✓ | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |

Manager : John KINGSTON

Quality, security and environmental approaches (QSE1)

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 3 | 3 | | | |

Evaluation

One evaluation : *QCM+exercices*

Bibliography

Ressources documentaires disponibles sur madoc :

- o Le Code du travail numérique
- o Code de l'environnement LEGIFRANCE
- o Les aventures de Napo vidéos d'animation INRS pour sensibilisation à la sécurité au travail
- o Publications et outils de l'INRS Institut national de recherche et de sécurité
- o AIDA : Site web des textes réglementaires du Ministère en charge de l'environnement
- o Les fiches sur le fonctionnement des principales institutions de la République, l'organisation de l'Union européenne et les relations internationales

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-3 | . | ✓ | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | ✓ | . | . | . | . |

Manager : John KINGSTON

Quality, security and environmental approaches (QSE2)

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 6 | | | | |

Evaluation

One evaluation : *QCM+exercices*

Bibliography

Références ou ressources documentaires disponibles sur madoc :

- Les fiches sur le fonctionnement des principales institutions de la République, l'organisation de l'Union européenne et les relations internationales
- Publications et outils de l'INRS Institut national de recherche et de sécurité
- Rapports détaillés des accidents industriels sur la base de donnée ARIA
- Outils MARP de Techniques de l'Ingénieur.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-3 | . | ✓ | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-5 | ✓ | . | . | . | . |

Manager : John KINGSTON

Research S7

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : Antoine GOULLET

Research S8

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : Antoine GOULLET

Rheology

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 3.75 | 5 | | | | 8.75 |

Evaluation

One evaluation : *Examen*

Manager : El-Khider SI-AHMED

Second foreign language - Japanese

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Second foreign language - Japanese

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Second foreign language - Sign language

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Second foreign language - Sign language

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Second foreign language - Spanish

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Second foreign language - Spanish

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Sensors and Process Control

Hours

| | | | | | |
|------|------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 7.5 | 8.75 | | 8 | | 24.25 |

Evaluation

3 evaluations :

- *CC*
- *Projet*
- *TP*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|--|---|---|---|---|---|
| • Choix de capteurs pour le suivi de réacteurs/bioréacteurs | · | ✓ | · | · | · |
| • Acquisition de l'information et traitement du signal | · | · | ✓ | · | · |
| • Connaissance des principes des capteurs physiques-chimiques et biologiques | · | · | ✓ | · | · |

Manager : Mariana TITICA

Socio-economic debates and Tools for shifting

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 21 | | | | 10 |

Evaluation

One evaluation : *Exposé débat*

Bibliography

De nombreuses références seront proposées dans chacun des 6 thèmes (liens vidéos, articles et livres) ; quelques livres de base peuvent cependant servir à tous les thèmes :

- BRAQUET Laurent et MOUREY David, Comprendre les fondamentaux de l'économie, De Boeck, 2015, 475 p., ISBN 978-2-8041-9021-7
- BIASUTTI Jean-Pierre et BRAQUET Laurent, Les débats économiques d'aujourd'hui, Ellipses, 2019, 278p, ISBN 9782340-031210
- DESCAMPS Christian, L'analyse économique en questions, Vuibert, 2005, ISBN 2-71117-7413-9
- SINAÏ Agnès, Penser la décroissance, Sciences Po Les presses, 2018, 210 p, ISBN 9782724613001
- SINAÏ Agnès, Economie de l'après-croissance, Sciences Po Les presses, 2018, ISBN 9782724617559
- PIKETTY Thomas, Capital et idéologie, Seuil, 2019, ISBN 978-2-02-133804-1
- COHEN Daniel, Le monde est clos et le désir infini, Albin Michel, 2015, ISBN 978-2226240293

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-3 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-1 | . | ✓ | . | . | . |
| • TPN-2 | . | ✓ | . | . | . |
| • TPN-3 | . | ✓ | . | . | . |
| • TPN-8 | ✓ | . | . | . | . |
| • TPN-9 | ✓ | . | . | . | . |
| • TPN-10 | . | ✓ | . | . | . |
| • TPN-11 | ✓ | . | . | . | . |

Manager : Chrystèle GONCALVES

Soft skills

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 7.5 | | | | |

Evaluation

One evaluation : *Examen:cas pratique*

Bibliography

- La confiance en gestion : un regard pluridisciplinaire (Boissieu & Oguchi, 2011)
 - Trust Rules: How the World's Best Managers Create Great Places to Work (Lee, 2017)
 - Give and Take: A Revolutionary Approach to Success (Grant, 2013)
 - L'entreprise une affaire de don (Collectif, 2016)
 - La théorie des jeux - Science étonnante
 - Jeu sur l'évolution de la confiance
 - The Office (NBC, 2005)
 - Mad Men (HBO, 2007)

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-1 | ✓ | . | . | . | . |
| • TPN-2 | ✓ | . | . | . | . |
| • TPN-4 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |
| • TPN-5 | ✓ | . | . | . | . |
| • TPN-6 | ✓ | . | . | . | . |
| • TPN-7 | ✓ | . | . | . | . |
| • TPN-12 | ✓ | . | . | . | . |
| • TPN-13 | ✓ | . | . | . | . |
| • TPN-20 | ✓ | . | . | . | . |
| • TPN-21 | ✓ | . | . | . | . |

Manager : Roland BESSEYAY

Solution chemistry

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 5 | 6.25 | | | | 11.25 |

Evaluation

One evaluation : *Examen*

Statistics and probability

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 10 | 11.25 | | | | 21.25 |

Evaluation

One evaluation : *Examen*

Manager : Laurence MIEGEVILLE

Stirring and mixing

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|-------|
| 5 | 6.25 | 6 | | | 17.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Caroline GENTRIC

SuperPro Designer

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|------|----|------|----|------|
| 7.5 | 11.5 | 13 | 16 | | 44 |

Evaluation

One evaluation : *Projet*

Manager : El-Khider SI-AHMED

Sustainable development and social responsibility 1

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 1.5 | 13.5 | | | | |

Evaluation

One evaluation : *Grille d'évaluation*

Bibliography

- Travaux du GIEC
 - Global carbon project

Learning outcomes

| | N | A | M | E | O |
|---------|---|---|---|---|---|
| • TPN-3 | ✓ | · | · | · | · |

Manager : Laurence CHARPENTIER

Sustainable development and social responsibility 2

Hours

| | | | | | |
|------|-----|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| | 9 | | | | 10 |

Evaluation

One evaluation : *Soutenance + Rapport*

Bibliography

- Travaux du GIEC
 - Global carbon project

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|-------------------|---|---|---|---|---|
| • TPN-3 | . | ✓ | . | . | . |
| • TPN-5 | . | ✓ | . | . | . |

Manager : Laurence CHARPENTIER

Systemic analysis

Hours

| | | | | | |
|------|------|----|------|----|------|
| Lect | Tut | PW | Proj | WP | Asst |
| 3.75 | 8.75 | | | | 12.5 |

Evaluation

One evaluation : *CC*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Analyser un système (paramètres, phénomènes, fonctionnement) | . | . | . | ✓ | . |
| • Modéliser une fonction de transfert, ajuster les paramètres du modèle sur une réponse expérimentale | . | . | ✓ | . | . |
| • Proposer une démarche expérimentale basée sur la distribution des temps de séjour pour diagnostiquer le fonctionnement d'un procédé | . | . | ✓ | . | . |

Manager : Luc MARCHAL

Thermochemistry

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|-------|
| 6.25 | 10 | 8 | | | 24.25 |

Evaluation

2 evaluations :

- *Examen*
- *TP*

Manager : Agnès MONTILLET

Thermodynamic model

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| 2.5 | 2.5 | 5 | | | 10 |

Evaluation

One evaluation : *Projet*

Manager : Walid BLEL

Thermodynamics

Hours

| | | | | | |
|-------|------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 13.75 | 22.5 | | | | 37.75 |

Evaluation

3 evaluations :

- *Contrôle continu*
- *Examen*
- *TP*

Bibliography

- CLEYNEN Olivier, thermodynamique de l'ingénieur, <https://thermodynamique.fr/framabook-thermodynamique.pdf>, 2019.

- GICQUEL Renaud, « Systèmes énergétiques », tome 1 : Méthodologie d'analyse, bases de thermodynamiques, tome 2 : Applications classiques, tome 3 : Cycles avancés, systèmes innovants à faible impact environnemental, régime non-nominal, Presses des Mines, Paris, 2009

- VAN WYLEN Gordon, SONTAG Richard, DESROCHERS Pierre, « Thermodynamique appliquée », 2ème édition, ERPI, Ottawa, Canada, 1992.

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Learn about dithermal machines | . | ✓ | . | . | . |
| • Know the thermodynamic principle of operation of dithermal machines and be able to plot their cycle in any diagram. | . | ✓ | . | . | . |
| • Use a dither machine cycle to calculate its performance | . | ✓ | . | . | . |
| • Know and apply the thermodynamic properties of moist air (psychrometry) | . | ✓ | . | . | . |

Manager : Annaig COTONNEC

Training for Toeic

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Training for Toeic

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | 18 | | | | |

Evaluation

One evaluation : *CC*

Transition Engineering and Interdisciplinarity S7

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | 32 | | |

Evaluation

One evaluation : *Evaluation*

Manager : Bruno AUVITY

Transition Engineering and Interdisciplinarity S8

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-----|----|------|----|------|
| | | | | 32 | |

Evaluation

One evaluation : *Evaluation*

Manager : Bruno AUVITY

Turbulence

Hours

| Lect | Tut | PW | Proj | WP | Asst |
|------|-------|----|------|----|-------|
| 7.5 | 11.25 | | | | 18.75 |

Evaluation

3 evaluations :

- *Examen*
- *CC*
- *TP/projet*

Manager : El-Khider SI-AHMED

Worksheets and Databases

Hours

| | | | | | |
|------|------|----|------|----|-------|
| Lect | Tut | PW | Proj | WP | Asst |
| 7.5 | 1.25 | 12 | | | 20.75 |

Evaluation

2 evaluations :

- *Examen écrit*
- *TP*

Learning outcomes

| Learning outcomes | N | A | M | E | O |
|---|---|---|---|---|---|
| • Manipuler efficacement les fichiers Excel? (filtres, rapports automatiques, macros) | . | . | ✓ | . | . |
| • Création de base de données Access? et extraction de données dans Excel? | . | . | ✓ | . | . |

Manager : Carole CASTAGLIOLA