Third (3rd) year of Pharmacy study

Second semester: from January to May
Exam period: May

UE (Teaching unit)	ECTS
UE 17B ACTIVE DRUG SUBSTANCES 2: Medicinal chemistry	**5**
UE 17B ACTIVE DRUG SUBSTANCES 2: Pharmacognosy	**4**
UE 23B PATHOLOGIES 1: Water-Electrolytes-Acid base-Kidney	**5**
UE 24 PATHOLOGIES 2: Infectious diseases	**10**
UE 25 PATHOLOGIES 3: Clinical immunology	**5**
UE 25 PATHOLOGIES 3: Clinical hematology	**5**
UE 27 QUALITY CONTROL	**5**
UE 30 PATHOPHYSIOLOGY AND CLINICAL SEMIOLOGY	**5**
UE 31 BIOLOGICAL SCIENCES 4: Parasitology	**5**
UE 31 BIOLOGICAL SCIENCES 4: Medical mycology	**4**
UE 60 BIOTECHNOLOGY	**4**
UE 28 FREE second semester UE*	**4**

Some UEs have very few face-to-face lessons and teachers will drop courses on the e-Campus pedagogical platform early in the year for students to do personal work. For example, 1 hour of lesson could be equivalent to 6h / 7h of lessons realized in the form of personal work. * Free EU can be accessed (subject to availability), but the choice and enrollment in these UEL must be done imperatively on site.

Troisième (3ème) année des études de Pharmacie

Deuxième semestre : de janvier à mai
Période d'examens : mai

UE (Unité d'enseignement)	ECTS
UE 17B SUBSTANCES ACTIVES MÉDICAMENTS 2 : Chimie Thérapeutique	**5**
UE 17B SUBSTANCES ACTIVES MÉDICAMENTS 2 : Pharmacognosie	**4**
UE 23 PATHOLOGIES 1 : Eau-Electrolytes-Acide base-Rein	**5**
UE 24 PATHOLOGIES 2 : Infectiologie	**10**
UE 25 PATHOLOGIES 3 : Immunologie clinique	**5**
UE 25 PATHOLOGIES 3 : Hématologie clinique	**5**
UE 27 CONTRÔLE QUALITÉ	**5**
UE 30 PHYSIOPATHOLOGIE ET SÉMIOLOGIE	**5**
UE 31 SCIENCES BIOLOGIQUES 4 : Parasitologie	**5**
UE 31 SCIENCES BIOLOGIQUES 4 : Mycologie médicale	**4**
UE 60 BIOTECHNOLOGY	**4**
UE 28 UE Libre second semestre*	**4**

Certaines UE ne comportent que très peu d'heures de cours en présentiel et les enseignants déposeront des cours sur la plateforme pédagogique e-Campus en tout début d'année pour que les étudiants réalisent un travail personnel. Ainsi, par exemple, 1 h de cours pourra être équivalent à 6h/7h de cours réalisés sous la forme de travail personnel. *Des UE libres peuvent être accessibles (sous réserve de places disponibles), mais le choix et l'inscription à ces UEL doivent se faire impérativement sur place.

UE 17B ACTIVE DRUG SUBSTANCES 2: Medicinal chemistry

5 ECTS

Content

Classes*

- **Synthetic drugs for oncology: conventional chemotherapy "cytotoxic agents"**
- **Drugs for cardiovascular pathologies**
  Antihypertensive drug
  Treatment of the heart failure
  Synthetic antithrombotic agents
- **Drugs of the respiratory tree: anti-asthmatics**
- **Treatment of dyslipidemia**
  Drugs acting on fatty acids, cholesterol, and apolipoproteins
- **Treatment of type 2 diabetes**
- **Drugs for gastroduodenal pathologies**
  Inhibitors of proton pump, anti-H2, gastric dressings
- **Infectious disease drugs (except beta-lactams, and anti-virals)**
  Antibacterial sulfonamides, nitrofurans / imidazoles
  Quinolones
  Anti-TB drugs
  Anti-fungal synthetic drugs
  Anti-malaria synthetic drugs
  Anti-helminths synthetic drugs
  Antiseptics

Tutorials*

Cardiology and dyslipidemia
Gastroduodenal pathologies and oncology
Reviewing work

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students).

Assessment

Final exam about classes and tutorials.

Contact

Jean-François Peyrat

UE 17B ACTIVE DRUG SUBSTANCES 2: Pharmacognosy

4 ECTS

Content

Classes*

Anticancer of natural origin (second part)
Immunosuppressants and immunomodulators of natural origin
Antiparasitic and antifungal agents of natural origin
Active ingredients of natural origin affecting carbohydrate metabolism
Antithrombotics and thrombolytics of natural origin

Tutorials*

About classes content

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students).

Assessment

Final exam about classes and tutorials.

Contacts

Erwan Poupon

UE 23B PATHOLOGIES 1: Water-Electrolytes-Acid base-Kidney

5 ECTS

Content

Classes*

- **Hydro-electrolytic and acid-base disorders**
  Water and sodium, potassium and uric acid balance
  Acid-base balance
  Rehydration and vascular filling solutions
- **Renal pathologies**
  Renal pathologies
  Biochemical explorations of renal pathologies
  Drug therapy of patients with chronic renal failure
    Medicinal treatment of uremic patients
    Renal replacement: removing waste and excess water from the blood (artificial replacement for lost kidney function)
  Prescription of drugs to patients with chronic renal failure or undergoing hemodialysis
  Drugs and nephrotoxicity
    Renal toxicity
- **Notions of urology**
  Prostatic pathologies
  Urinary incontinence
  Erectile dysfunction

Tutorials*

Hydro-electrolytic and acid-base disorders
Renal pathologies and treatments

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students)

Assessment

Final exam about classes and tutorials.

Contact

Jean-Louis Paul

UE 24 PATHOLOGIES 2: Infectious diseases

10 ECTS

Content

Classes*

- **Chemistry of anti-infectives**
  Introduction to pharmacognosy. General information on drug production
  Aminoglycosides, macrolides, tetracyclines, glycopeptides, natural penicillins, natural antifungal agents, semisynthetic penicillins, cephalosporins, monobactams, β-lactamase inhibitors, quinolones, sulfonamides, nitrofurans, nitroimidazoles.
  Anti-TB drugs
  Synthetic antifungal agents
  Antiviral drugs
  Pharmacokinetics of antibiotics
  Pharmacokinetics of antiretroviral drugs
  Antibiotics: modes of action, resistance mechanisms, strategies
  Antiviral drugs: modes of action and resistance mechanisms
  Antiparasitic drugs: mode of action, strategies
  Antifungals: mode of action, strategies
- **Clinical pharmacology and therapy**
  Host-microorganism interactions
  Bacteremia and endocarditis
  Central nervous system infections
    General aspects
    Bacterial meningitis: *N. meningitidis, S. Pneumoniae*…
    Neonatal meningitis: *S. agalactiae, E. coli, L. monocytogenes* (see infections of newborns)
    Viral meningitis and lmeningo-encephalitis: enterovirus, HSV-1, HSV-2...
  ENT and bronchopulmonary infections
    General aspects
    ENT infections: *S. pyogenes, S. pneumoniae, H. influenzae*
    RSV bronchiolitis
    Flu
    Alveolar acute bacterial pneumonia: *S. pneumoniae*
    Interstitial acute bacterial pneumonia: *L. pneumophila*
    Chronic bacterial pneumonia: *M. tuberculosis*
  Digestive tract infections
    General aspects
    Viral diarrhea: rotavirus
    Bacterial diarrhea: *Salmonella spp., Shigella spp., Campylobacter jejuni, Clostridium difficile*
    Gastric ulcer: *Helicobacter pylori*
  Urinary infections and STI
    General aspects
    Urinary infections: *E. coli*, *Staphylococcus spp*., *Pseudomonas aeruginosa*
    Bacterial STI: *N. gonorrhoeae*, *T. pallidum*, *C. trachomatis*
    Viral STI: papillomavirus, HSV, HIV, HBV
  HIV infections

Infections of immunocompromised people
Skin, soft tissues, and osteoarticular infections
General aspects
Bacterial infections: *S. aureus*, *S. pyogenes*…
Eruptive viral infections: herpes, rubella, (measles and VZV off internship program)
Infections of mother and newborn
General aspects
Bacterial infections: *T. pallidum*, *Listeria monocytogenes*, *S. agalactiae*, *E. coli*...
Viral infections: rubella, CMV, varicella, HIV, HBV
Infections and toxin-producing bacteria

Tutorials*
Host-microorganism interactions
ENT and bronchopulmonary infections
Virology, Clinical Pharmacy: antiretroviral drugs, anti-herpetic drugs

Practical works*
Bacteriology, Virology

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students), **Practical works** (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Florence Doucet-Populaire

UE 25 PATHOLOGIES 3: Clinical immunology

5 ECTS

Content

Classes*

- Monoclonal gammapathies and MGUS
- Asthma and allergies
- Autoimmune diseases
  - Rheumatoid arthritis and lupus (Pathophysiology and biological diagnosis)
  - Semiology and treatment
  - Liver, thyroid, and CNS
- Transplant and graft immunology
- Immunosuppressants, other than corticosteroids
- Pharmacokinetics and therapeutic strategies
- Congenital immunodeficiencies
- Immunotoxicology

Tutorials*

- Monoclonal gammapathies and MGUS
- Asthma and allergies
- Autoimmune diseases

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students),

Assessment

Final exam about classes and tutorials.

Contact

Sylvie Chollet-Martin

UE 25 PATHOLOGIES 3: Clinical hematology

5 ECTS

Content

Classes*

- Anomalies in blood count
- Anemias
  - Deficiency anemia
  - Hemolytic anemia
  - Sickle cell disease
  - Thalassemias
- Primary hemostasis pathologies
  - von Willebrand disease VWD
  - Thrombocytopenia
- Diagnosing prolongation of QT and/or APTT
  - Hemophilia
- Acute leukemias
- Myelodysplastic syndromes
- Myeloproliferative syndromes
  - CML
  - Polycythemia
- Lymphoid malignancies
  - Myeloma - MGUS
  - Chronic lymphocytic leukemia (CLL)
  - Lymphomas
- Labile blood products

Tutorials*

- Primary hemostasis pathologies

Practical works*

- Anemias
- Acute leukemias

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students), **Practical works** (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Delphine Borgel

UE 27 QUALITY CONTROL

5 ECTS

Content

Classes*

Regulatory environment of quality control - Guidelines
Sampling: statistical aspects (representativeness, sampling plan) and techniques (preparation methods of analytical solutions)
Content of control monographs
Formatting results and calculating uncertainty - Specifications - Analysis reports - Result compliance
Validation of analytical methods: general aspects - Validation criteria (specificity, answer/response/reply feature)
Validation criteria (continued) (accuracy, correctness, precision, detection and quantification limits)
Validation of methods: Accuracy profile approach
Statistical control of process: production monitoring through control charts
Comparative study of method performances

Tutorials*

Tutorial organized from one molecule.
- Active raw material analysis (case study)
- Validation of a plasma assay from the critical analysis of a published article
- Dosage of the active substance in the environment (case study)
- Production monitoring

Practical works*

Dosage of the active substance in the finished product: study of the function
Dosage of the active substance in the finished product: determination of the validation criteria
Validation approach through the accuracy profile (in computer room)

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students), **Practical works** (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Arlette Baillet-Guffroy

UE 30 PATHOPHYSIOLOGY AND CLINICAL SEMIOLOGY

5 ECTS

Content

Classes*

General pathophysiology. Basic principles.
Respiratory system pathophysiology.
Cardiovascular system pathophysiology.
Kidney pathophysiology.
Digestive tract pathophysiology.
Semiology. Basic principles. Skin semiology.
Respiratory and cardiovascular systems semiology.
Digestive tract and genito-urinary systems semiology.
Nervous, sensory and musculoskeletal systems semiology.

Tutorials/Practical works*

Preparatory work session
Disease analysis strategy from a pathophysiological point of view.
Workshops
Knowledge application
Analysis of a clinical record, preparation of an oral presentation
Presentation, analysis and correction of the oral presentation

* **Classes** (all students in amphitheater), **Tutorials**/**Practical works** (small groups of students).

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contacts

Vladimir Veksler
Imad Kansau

UE 31 BIOLOGICAL SCIENCES 4: Parasitology

5 ECTS

Content

Classes*

- Background
- Malaria
- Echinococcosis
- Schistosomiasis
- Taeniotes
- Other helminthiasis

Practical works*

- Medical Entomology
- Toxoplasmosis
- Amebiasis
- Giardiasis
- Urogenital trichomoniasis
- Trypanosomiasis
- Leishmaniosis (L. i.)
- Helminthosis
- Recognitions

* **Classes** (all students in amphitheater), **Practical works** (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Final exam about classes.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Philippe Loiseau

UE 31 BIOLOGICAL SCIENCES 4: Medical Mycology

4 ECTS

Content

Classes*
- Background
- Antifungal agents

Practical works*
- Yeast infections
  - *C. albicans*
  - *C. neoformans*
- Infection with *A. fumigatus*
- Pneumocystosis by *P. Jirovecii*
- Dermatophytes

* **Classes** (all students in amphitheater), **Practical works** (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Final exam about classes.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Annick Simon

UE 60 BIOTECHNOLOGY

4 ECTS

Content

Classes*

Production of recombinant proteins:
Engineering of recombinant DNA, cell transgenesis, cells and host organisms, cultures and bioreactors in industrial production, purification and characterization processes
Formulation, quality control and PK / PD aspects of recombinant proteins
Therapeutic approaches based on the use of recombinant proteins (mAb, vaccination, therapeutic cytokines)
Therapeutic approaches using cell therapy
Therapeutic approaches using gene therapy
Safety and toxicological aspects of recombinant proteins

Tutorials*

Production of recombinant proteins

* **Classes** (all students in amphitheater), **Tutorials** (small groups of students);

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contact

Myriam Taverna
Nathalie Chaput-Gras