Third (3rd) year of Pharmacy study

First semester: from September to December
Exam period: early January

UE (Teaching unit)	ECTS
UE 17A ACTIVE DRUG SUBSTANCES 1: Medicinal chemistry	**5**
UE 17A ACTIVE DRUG SUBSTANCES 1: Pharmacognosy	**4**
UE 17A ACTIVE DRUG SUBSTANCES 1: Coordinated practical works	**3**
UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY: Fundamental pharmacology	**5**
UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY: General toxicology	**5**
UE 20 HEALTH SYSTEMS: Public health	**3**
UE 20 HEALTH SYSTEMS: Nutrition	**2**
UE 23A PATHOLOGIES 1: Endocrinology	**5**
UE 26 FORMULATION, DRUG MANUFACTURING	**7**
UE 21 First semester FREE 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

Premier semestre : de septembre à décembre
Période d'examens : début janvier

UE (Unité d'enseignement)	ECTS
UE 17A SUBSTANCES ACTIVES MÉDICAMENTS 1 : Chimie Thérapeutique	**5**
UE 17A SUBSTANCES ACTIVES MÉDICAMENTS 1 : Pharmacognosie	**4**
UE 17A SUBSTANCES ACTIVES MÉDICAMENTS 1: Travaux pratiques coordonnés	**3**
UE 18 SCIENCES PHARMACOLOGIQUES ET TOXICOLOGIE : Pharmacologie fondamentale	**5**
UE 18 SCIENCES PHARMACOLOGIQUES ET TOXICOLOGIE : Toxicologie générale	**5**
UE 20 SYSTÈMES DE SANTÉ : Santé publique	**3**
UE 20 SYSTÈMES DE SANTÉ : Nutrition	**2**
UE 23A PATHOLOGIES 1: Endocrinologie	**5**
UE 26 FORMULATION, FABRICATION MÉDICAMENTS	**7**
UE 21 UE LIBRE premier 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 17A ACTIVE DRUG SUBSTANCES 1: Medicinal chemistry

5 ECTS

Content

Classes*

- **General information on synthetic active ingredients and their control**
- **Basis of Molecular modeling, design of active ingredients**
- **Drugs for hormonal pathologies (steroids)**
- **Synthetic active ingredients used in psychiatry and neurology (CNS drugs)**
  Psychotropic drugs (anxiolytics, neuroleptics, anti-depressants)
  Neurology (anti-epileptics, anti-parkinsonian, anti-emetics, anti-migraine, anti-Alzheimer's)
  General anesthesia
  Local anesthesia
- **Anti-allergic anti-H1**
- **Non-steroidal anti-inflammatory drugs (NSAIDs), Analgesics, Diagnostic Drugs**

Tutorials*

Neurology
Psychiatry
Steroids
Reviewing work

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

Assessment

Final exam about classes and tutorials.

Contact

Christophe Fourneau

UE 17A ACTIVE DRUG SUBSTANCES 1: Pharmacognosy

4 ECTS

Content

Classes*

General information on the active ingredients of natural origin
Heterogeneous polysaccharides
Essential oils
Natural polyphenolic substances
Active ingredients of natural origin acting on the nervous system
Active ingredients of natural origin acting on pain and inflammation
Active ingredients of natural origin acting on the digestive tract
Anticancerous of natural origin (first part)

Tutorials*

About classes content

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

Assessment

Final exam about classes and tutorials.

Contacts

Christophe Fourneau

UE 17A ACTIVE DRUG SUBSTANCES 1: Coordinated practical works

3 ECTS

Content

Practical works*

- **Organic chemistry and medicinal chemistry**
  Control of 2 active substances (sulfamethoxazole et lidocaine) and the corresponding galenic form.
  Control of raw material and selected corresponding galenic according to the monograph.
  Introduction to molecular modeling on calculation station.
- **Pharmacognosy**
  Control of medicinal plants, extraction of active substances, control of active substances from plant origin

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

Assessment

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

Contacts

Christophe Fourneau
Alain Danan

UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY: Fundamental pharmacology

5 ECTS

Content

Classes*

- **Introduction: models used in experimental pharmacology**
- **Drug targets and neural-hormonal-autocoid transmissions**
  Serotonergic transmission
  Adrenergic/noradrenergic transmission
  Cholinergic transmission
  Dopaminergic transmission
  Histaminergic transmission
  GABAergic transmission
  Glutamatergic transmission
  Pathway of nitric monoxide
  Neuropeptides (substance P)
  Pharmacology of steroid anti-inflammatory (medicinal chemistry and pharmacology)
- **Ion channel receptors: molecular targets of drugs**
  Ion channels
    Sodium channels (Na_V, ENaC)
    Calcium channels (Ca_V, R. IP_3, RyR)
    Potassium channels (K_V, K_{ATP}, K_{Ach})
  Ion pumps
    Na^+/K^+-ATPase
    H^+/K^+-ATPase
    Ca^{2+}-ATPase
  Ion carriers

Tutorials*

Sympathetic and parasympathetic transmissions
Serotonin
Dopamine
Ion channel receptors: GABA and glutamate
Ion transports

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

Assessment

Final exam about classes and tutorials.

Contacts

Alain Gardier
Véronique Leblais

UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY: General toxicology

5 ECTS

Content

Classes*

- **General toxicology**
  Toxicology: definitions, major mechanisms of toxicity, drug iatrogenesis
  Xenobiotic metabolism and toxicity
  Protocols and experimental methods to assess the toxicity of molecules
  Analytical toxicity
- **Clinical toxicology**
  Clinical toxicology: symptoms, treatments and antidotes
  Salicylate toxicology
- **Domestic toxicology**
  Lead toxicology
  Carbon monoxide toxicology
  Methanol and ethylene glycol
- **Environmental toxicology**
  Toxicology of arsenic and pesticides
  Toxicology of cadmium and mercury
  Toxicology of polycyclic aromatic hydrocarbons and dioxins
  Toxicology of endocrine origin, including endocrine disruptors

Tutorials*

General toxicology

Practical works*

General toxicology
Clinical toxicology
Environmental toxicology

* **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.

Contacts

Marc Pallardy
Saadia Romer-Kerdin

UE 20 HEALTH SYSTEMS: Public health

3 ECTS

Content

Classes*

- **Public health**
  Definition, fields of intervention
  Roles of pharmacists
  Importance of education for health
  Main actors: at the international and national levels
  The concept of risks
- **Epidemiology**
  Definitions and fields of application
  Main types of investigations (transversal, case-control, cohort)
  Notions of statistics (expectancy, standard deviation, estimation, sampling fluctuation)
  Commonly used descriptive and etiological indicators
  Main biases (selection, ranking, confusion) and notion of adjustment
  Interpreting survey/investigation results, notion of causality
- **Health: physical and mental hygiene**
  Physical and personal hygiene: roles in prevention, main pathologies, sport and health, doping and prevention
  Travel and health prevention
  Mental hygiene: prevention, depression, suicides
- **Prevention of communicable diseases**
  General principles of prevention
  Disinfection, sterilization
  Examples: tuberculosis, sexually transmitted diseases, flu…
- **Prevention of non-communicable diseases**
  Cardiovascular diseases and metabolic syndrome
  Cancers
  Addictions and dependencies: illicit drugs, smoking, alcoholic disease
- **Contraception**
- **Maternal and child health**
- **Disability and society**
- **Seniors health**
- **Health and environment**
  Importance - Multidisciplinary - Fields of intervention, major compartments and ecosystems
  Air pollution and health risks
  Waste and health risks, management
  Water and life: pollution and health issues, water resources, quality standards, microbiological risk, chemical risk, drinking water production and distribution, wastewater treatment, packaged waters, the hydrotherapy / balneology, water in hospitals

* **Classes** (all students in amphitheater).

Assessment

Final exam about classes.

Contacts

Yves Levi
Jérémie Botton

UE 20 HEALTH SYSTEMS: Nutrition

2 ECTS

Content

Classes*

- **Introduction**
  Food and health
  Bad habits observed in our food in the past 50 years
  The goals of the National Health and Nutrition Plan (Plan National Nutrition-Santé PNNS)
- **Nutritional needs**
  The body's needs
  Recommended dietary allowances: energy requirements, nutrients (proteins, lipids, carbohydrates, vitamins, minerals and trace elements, dietary fibers)
- **Food**
  Dairy products
  Meat, eggs, fish and seafood
  Vegetables and fruits
  Bread and cereals
  Sugar and sweet products
  Fats
  Beverages
  Foods rich in antioxidant micronutrients
  Processed and industrialized foods
  Food labeling
- **Balanced diet**
  Body Mass Index (BMI)
  International classification of body weight and obesity
  Balanced distribution of nutrients: typical daily ration
- **Food safety**
  Food safety government structures
  Food allergies and intolerances
  Food-borne diseases
  Potential chemical contamination of foods

* **Classes** (all students in amphitheater).

Assessment

Final exam about classes.

Contact

Noureddine Bouaïcha

UE 23A PATHOLOGIES 1: Endocrinology

5 ECTS

Content

Classes*

- **Physiology**
  General endocrinology
  Principles of the hypothalamic-pituitary axis
  Pituitary hormones - ADH and oxytocin
  Thyroid
  Adrenal glands
  The growth hormone
  The adrenal medulla, the catecholamines
  Male sexual hormones
  Female sexual hormones
- **Clinical endocrinology**
  Endocrine pathologies, treatment and therapeutic strategies
  Endocrine biochemical explorations (including sexual hormones)
- **Pregnancy**
  Hormonal regulation
  Placenta
  Physiology of pregnancy
  Biological exploration
  Semiology of pregnancy

Tutorials*

General endocrinology
Clinical endocrinology

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

Assessment

Final exam about classes and tutorials.

Contacts

Vladimir Veksler
Imad Kansau

UE 26 FORMULATION, DRUG MANUFACTURING

7 ECTS

Content

Classes*

The dermal route and associated forms
The pulmonary route and associated forms
The ophthalmic route and associated forms
Nose and ear routes and associated forms
The rectal and vaginal route and associated forms
Formulation of substances from biotechnology
Targeting vectors of active principles/properties/ingredients

Tutorials*

Preparatory tutorial to Practical work about skin gels

Practical works*

Formulation of skin gels
Rheology assays

* **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

Elias Fattal