



الجمهورية الجزائرية الديمقراطية الشعبية
 People's Democratic Republic of
 Algeria وزارة التعليم العالي والبحث
 العلمي
 Ministry of Higher Education
 and Scientific Research

University

Logo

MASTER TRAINING OFFER
 ACADEMIC

TRAINING OFFER
MASTER
ACADEMIC

NATIONAL PROGRAM
2022- 2023

Establishment	Faculty / Institute	Département
University Djilali Bounaama of KhemisMiliana	Faculty of Sciences and Technology	

Field	Branch	Speciality
Science of matter	Chemistry	<i>Pharmaceutical chemistry</i>

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023



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Ministry of Higher Education
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اللجنة البيداغوجية الوطنية
لميدان العلوم و التكنولوجيا
National Pedagogical
Committee for Science
and Technology



عرض تكوين ماستر

ليسانس أكاديمي برنامج وطني 2022- 2023

القسم	الكلية/ المعهد	المؤسسة
قسم علوم المادة	كلية العلوم والتكنولوجيا	جامعة الجيلالي بونعامة بخميس مليانة

التخصص	الفرع	الميدان
الكيمياء الصيدلانية	كيمياء	علوم المادة

I – Course organization sheets specialty

Semester 1

Teaching unit	Matter	Credit	Coefficient	C	TD	TP	Volume (hour)
Fundamental Unit	Pharmaceutical industry	4	2	1h30	1h30		45h00
	Bases of organic synthesis	4	2	1h30	1h30		45h00
	General and pharmacology and molecular	4	2	1h30	1h30		45h00
	Structural biochemistry	3	1,5	1h30	45min		33h45
	Drug technology	3	1,5	1h30	45min		33h45
Methodologic al unit	Physico-chemical methods of analysis I	3	2	1h30	1h		37h30
	Laboratory I	4	2			3h	45h
	Pharmaceutical equipment	2	1	1h30			22h30
Discovery unit	Green chemistry	1	1	1h30			22h30
Transversale	Language and communication	2	2	3h			45h

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Teaching unit	Matter	Credit	Coefficient	C	TD	TP	Volume (hour)
Unit							

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Second Semester 2

Teaching unit	Matter	Credit	Coefficient	C	TD	Practical Work	Volume (hour)
Fundamental Unit	Pharmaceutical chemistry II	4	2	1h30	1h30		45h00
	Chemistry of natural substances	4	2	1h30	45 min		33h45 min
	Drug Technology II	4	2	1h30	45min		33h45min
	General microbiology and industrial	3	1,5	1h30	1h30		45h00
	Metabolic biochemistry	3	1,5	1h30	1h30		45min
Methodological unit	Physico-chemical methods of analysis II	2	1	1h30			22h30min

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Teaching unit	Matter	Credit	Coefficient	C	TD	Practical Work	Volume (hour)
	Kinetics, Catalysis and Electrochemistry	3	2	1h30	1h		37h30min
	Laboratory II	4	2			3h	45h00
Discovery unit	Toxicology and safety Industrial	1	1	1h30			22h30
Transversale Unit	Language and Communication II	2	2	3h			45h

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Third Semester

Teaching unit	Matter	Credit	Coefficient	C	TD	TP	Volume (hour)
Fundamental Unit	Analysis and control of drug	5	3	3h	1h30		67h30
	Heterocyclic Chemistry	5	2	3h	1h30		67h30
	Macromolecular Chemistry	4	2	1h30	45min		33h45
	Botanical Pharmaceutical	4	2	1h30	45min		33h45
Methodological unit	Statistical Methodology and Optimization	4	2	1h30		1h30	45h00
	Electrochemical analysis	3	2	1h30		1h00	37h30
	Environmental Chemistry and fight against pollution	2	1	1h30			22h30
Discovery unit	Management and research strategy and development in industry pharmaceutical	1	1	1h30			22h30
Transversale Unit	English and documentation scientific	2	2	3h			45h

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

II - Detailed program by subje

Title of the Master: Pharmaceutical Chemistry

Semester: 1

Unit title: UEF 1.1

Subject 1: Pharmaceutical Chemistry I

Credits: 04

Coefficient: 02

Teaching objectives:

Most of the course will consider the optimization of the guide structure in terms of power of action, selectivity and safety of use, all from the pharmacodynamic and pharmacokinetics.

Recommended prerequisites:

Organic chemistry and inorganic chemistry

Content of the subject:

Introduction. : History, crude and object of pharmaceutical chemistry

PART ONE: NON-ORGANIC MEDICINES

CHAPTER I: Medicinal preparations based on halogens, hypochlorides, and iodine

CHAPTER II: Medicinal preparations based on hydrogen peroxide, sodium thiosulfate

CHAPTER III: Medicinal preparations based on nitrogen, arsenic and bismuth

CHAPTER IV: Medicinal preparations based on carbonates, hydrogen carbonates and activated charcoal

CHAPTER V: Medicinal preparations based on boron

CHAPTER VI: Medicinal preparations based on magnesium, calcium, barium, zinc and mercury

CHAPTER VII: Medicinal preparations based on copper, silver

CHAPTER VIII: Medicinal preparations based on iron

CHAPTER IX: Medicinal preparations based on iron

Part Two: ORGANIC MEDICINES

A-: Aliphatic drug preparations

CHAPTER I: Classification, obtaining and authentication. Structure-pharmacological effect relationship

CHAPTER II: Medicinal preparations of the class of aliphatic hydrocarbons and their halogenated derivatives

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CHAPTER III: Drug preparations of the class of alcohols

CHAPTER IV:

* Medicinal preparations of the class of aldehydes and their derivatives

* Medicinal preparations based on hexamethylenetetramine

CHAPTER V: Medicinal preparations of aliphatic carboxylic acids and their salts

CHAPTER VI: Drug preparations of the class of aliphatic amino acids

CHAPTER VII: Drug preparations of the class of aliphatic and arylaliphatic acid ethers

CHAPTER VIII: Medicinal preparations of the class of arylaliphatic, nitrous and nitric carboxylic esters

CHAPTER IX: Medicinal preparations based on carbonic acid derivatives (urethanes, ureides, acyclic ureides)

CHAPTER X: Drug preparations of the class of aliphatic amines and amino alcohols

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33% , Review: 67%

References (Books and handouts, websites, etc.).

[1] VG Belikov. "Treatise on Pharmaceutical Chemistry".

[2] P. Lebeau. "Treatise of Chemical Pharmacy".

[3] H. Gherib. "Pharmaceutical Organic Chemistry".

[4] F. Dorvault. "The pharmacy".

[5] J. Leboulanger. "Vitamins".

[6] F. Pellerin. "The study of drug stability".

[7] R. Bentefac. "Stability tests on active ingredients and finished products".

[8] Larousse. "New Larousse Medical".

[9] A.V. Elston. "Synthesis of Intermediates and Dyes".

[10] B.V. Passet. "Precise technical analysis and production control of chemical-pharmaceutical preparations and antibiotics".

[11] J.D. Roberts. "Modern Organic Chemistry"

Title of the Master: Pharmaceutical Chemistry

Semester: 1

Unit title: UEF 1.1

Subject title: Basics of organic synthesis

Credits: 04

Coefficients: 02

Teaching objectives:

At the end of this module, the trainee will be familiar with the main reactions as well as their use in multistep syntheses. He will know how to develop synthesis strategies. He will be able to make a comparative analysis of several methodologies. .

Recommended prerequisites:

Basic knowledge of mathematics and general chemistry.

Content of the subject:

Multi-step syntheses: synthetic strategies; protection-deprotection reactions; asymmetric synthesis and catalysis; analysis of publications; industrial developments.

Bioconversions, chemo-enzymatic syntheses: natural enzymes, custom enzymes; adaptation to organic solvents; applications of biocatalysis to fine chemicals; industrial applications.

Mode of assessment:

Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%

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Review: 67%

References (Books and handouts, websites, etc.).

Semester: 1
Title of the Master: Pharmaceutical Chemistry
Unit title: UEF 1.1
Subject title: General and molecular pharmacology
Credits: 04
Coefficients: 02

Teaching objectives:

Teaching objectives (Describe what the student is supposed to have acquired as skills after passing this subject – maximum 3 lines).-Acquisition of basic pharmacology notions.

Prerequisite knowledge recommended (brief description of the knowledge required to be able to

Organic chemistry

CHAPTER I:Introduction: History and development.

CHAPTER II:

II.1. Pharmacology concept. Pharmacology problem.

II.2. Methods and role of pharmacology in the field.

CHAPTER III:

III.1. Form of drug influence.

III.2. Notion of local and receptive influence. Direct and indirect influence.

III.3. Role of reflexes in indirect influence.

CHAPTER IV:

IV.1. Concept of selective influence. Synergism and antagonism.

IV.2. Pharmacological influence on disease pathogenesis.

IV.3. Sethiotropic and symptomatic drugs.

CHAPTER V: Importance of the chemical structure of drugs; influence of their physico-chemical properties.

CHAPTER VI:Methods of injecting drugs and their transformation in the body.

CHAPTER VII:

VII.1. Bodies influencing physiological function reflexes. Narcotic substances (influencing the central nerve), narcotic substances for inhalation: chloroform, chlorethyl: gaseous narcotic substances.

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VII.2. Non-volatile narcotics (non-inhalants, sedatives; barbiturates, salts of barbituric acid).

VII.3. Dependence on the influence of drug bodies (their doses) and the state of the organism. Importance of doses.

VII.4. Analgesic substances: opium group, derivatives of salicylic acid, pyrazolon and aniline.

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

[1] Larousse. "New Larousse Medical".

[2] J. Chaleon. "Chemical Pharmacology".

[3] Pelmont. "Enzymes".

[4] Pelmont. "Bacteria and the environment".

[5] J. Bourgeois. "Precis de Pharmacologie".

[6] M.Schoderet. "Pharmacology".

[7] Y.Cohen. "Abstract of Pharmacology"

Semester:1 Pharmaceutical Chemistry**Unit title: UEF 1.1****Subject title: Structural biochemistry****Credits: 03****Coefficients: 1.5****Teaching objectives**

Definition and object of biochemistry

Content of the subject**Recommended prerequisites:**

Descriptive Organic Chemistry - Stereochemistry

Content of the subject:

(Mandatory indicate the detailed content of the program in face-to-face and personal work)

CHAPTER I:Definition and object of biochemistry

I.1. methods used in biochemical research.

CHAPTER II:Amino acids

II.1. Classification

II.2. Biological functions

II.3. Acid-base properties

II.4. Isoelectric point

II.5. Stereoisomerism

II.6. Racemic separation methods.

CHAPTER III:

III.1. Proteins: biological functions, elemental composition, primary, secondary, tertiary and quaternary structure

III.2. Simple proteins, peptides and polypeptides, amino acid composition and sequence.

III.3. Enzymatic hydrolysis of proteins. Determination of primary structure

III.4. Synthesis of peptides and polypeptides by protection of functional groups

III.5. Protein complexes nucleoproteins, nucleosides, nucleotides, nucleic acids DNA and RNA chromoproteins: hemoglobin and myoglobin.

CHAPTER IV:

IV.1. Enzymes: classification, influence, of temperature, of pH on the activity of enzymes, relative specificity and absolute specificity, activators and inhibitors.

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IV.2. Kinetics of enzymatic reactions, Michaelis-Menten equation.

IV.3. Oxidoreductive enzymes (FAD, NAD), transferases, hydrolases (amylases, lipases, deoxyribonucleases, pepsin, trypsin, chymotrypsin) liases, synthetases.

IV.4. Active centers of enzymes, cofactors, mechanisms of action.

CHAPTER V: Vitamins-general characteristics

V.1. Water-soluble vitamins (B1, B2, B3, B4, B9, B12, C, H) structures,

V.2. Avitaminosis, hypovitaminosis, biological action,

V.3. Liposoluble vitamins (A, D, E, and K) structure, hypovitaminosis hypervitaminosis, biological action.

CHAPTER VI:

Thyroid gland hormones

VI.1. parathyroids of the pancreas, adrenals,

VI.2. Gonads of the pituitary

VI.3. Biological action, hypofunction and hyperfunction of hormones

CHAPTER VII:

VII.1. Carbohydrates

VII.1.1. biological functions, monosaccharides

VII.1.2. Stereoisomerism

VII.1.3. Tautomerism

VII.1.4. Derivatives of simple sugars: oxysugars, osamines, phosphorylated derivatives, osides, holosides, polyholosides, glycosides, oligosaccharides: glycogen, cellulose.

CHAPTER VIII:

VIII.1. Lipids

VIII.1.1. Fatty acids

VIII.1.2. glycerides

VIII.1.3. glycerophospholipids

VIII.1.4. steroids: sterols and derivatives

VIII.1.5. terpenes

VIII.1.6. carotenoids

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VIII.1.7. prostaglandin

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry

Semester: 1

Unit title: UEF 1.1

Title of subject: Drug Technology I

Credits: 03

Coefficients: 1.5

Objective and recommendations:

- Drug production and control equipment

Recommended prior knowledge (brief description of knowledge

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

Recommended prerequisites:required to be able to follow this course – Maximum 2 lines).

- General Chemistry

Content of the subject:

CHAPTER I:Introduction: Purpose and methods of drug technology.

CHAPTER II:Principles and forms of organization of drug production. Main notions of the production of drugs in industry and in pharmacy.

CHAPTER III:

III.1. Regulation of drug quality.

III.2. Regulation of toxic, effective drugs and their dosages.

III.3. Industrial regulations.

III.4. Documentation and technical standards. Forms of drugs.

CHAPTER IV:

IV.1. Companies in the pharmaceutical industry.

IV.2. Functions, role and structure. Material balance.

IV.3. Production regulations.

CHAPTER V:

V.1. Technology of galenic preparations

V.2. Steam installation of galenic units.

V.3. Crushing and sifting of solids.

V.4. Transfer of materials inside the units.

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

V.5. Separation of solids and liquids.

V.6. Pressing and filtration. Evaporation, drying.

CHAPTER VI:

VI.1. Solvents and extractants: distilled water, ethyl alcohol.

VI.2. the extraction and the factors influencing the extraction process.

VI.3. Infusions and herbal teas. Types of infusions.

CHAPTER VII:

VII.1. the extracts. Liquid and thick extracts.

VII.2. Technology of thick and dry extracts.

CHAPTER VIII:

VIII.1. Preparations from fresh plants and preparations of phytocides.

VIII.2. Preparations of vitamins, hormones and ferments.

CHAPTER IX:

IX.1. Medicinal oils. Syrups and flavored water.

IX.2. Medical soaps.

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33% , Review: 67%

Références (Livres et photocopiés, sites internet, etc).

[1] A. Le Hir. « Abrégé de pharmacie Galénique ».

[2] F.Dorvault. « L'officine ».

[3] F.Pellerin. « L'étude de la stabilité des médicaments ».

[4] R.Bentefac. « Les essais de stabilité sur les principes actifs et les produits finis ».

[5] Vogel's. « Text book of practical Organic Chemistry ».

[6] D.Pradeau. « Analyse pratique du médicament ».

[7] A.Lespagnol. « Précis de pharmacie chimique usuelle ».

[8] Chemiakine. « Chimie des antibiotiques ». Tome1 et Tome2

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry
Semester: 1
Title of the EU: EMU 1.1
Title of the subject: Physico-chemical methods of analysis I
Credits: 03
Coefficients: 02

Teaching objectives:

(Describe what the student is expected to have acquired as skills after success in this subject – maximum 3 lines).

- Characterization and identification of chemical substances.

Recommended prerequisites: brief description of knowledge required to be able to follow this course – Maximum 2 lines).

- Analytical Chemistry and Organic Chemistry

Content of the subject:

CHAPTER I: Introduction

I.1 Determination of physical constants:

- a) Density
- b) Index of refraction

I.2 Quantitative characterization tests of functional groups

CHAPTER II:

Separation methods in chromatography

- II.1. liquid chromatography
- II.2. Thin-layer chromatography
- II.3. gas chromatography
- II.4. Electrophoresis
- II.5. Application

CHAPTER III: Use of spectroscopic methods in analysis:

- III.1. Infrared spectroscopy
- III.2. UV-Vis spectroscopy
- III.3. fluorimetry
- III.4. nuclear magnetic resonance spectrometry

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

III.5. Atomic absorption spectrophotometry

III.6. Atomic emission spectrophotometry

III.6. mass spectroscopy

III.7. X-ray spectrophotometry

III.8. Photoelectron and ion spectroscopy (XPS or ESCA-UPS-AES).

III.9. Application

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33% , Review: 67%

Références (Livres et photocopiés, sites internet, etc).

[1] F. Rouessac , A. Rouessac et D. Cruché « Analyse chimique : Méthodes et techniques instrumentales modernes, cours et exercices corrigés », Dunod, 2006.

[2] D. Kiemle « Identification spectrométrique des composés organiques », De Boeck ,2e édition, 2007

[3] R. M. Silverstein, G. C. Bassler, T. C. Morrill « Identification spectrométrique des composés organiques », De Boeck, 1998.

[4] D. A. Skoog, F. J. Holler et T. A. Nieman « Principes d'analyse instrumentale », De Boeck, 2003

Title of the Master: Pharmaceutical Chemistry

Semester: 1

Title of the EU: EMU 1.1

Subject title: Pharmaceutical equipment

Credits: 02

Coefficients: 01

Teaching objectives:

Know the operating principle of different equipment in industry pharmaceutical.

Recommended prior:

- Thermodynamics, analytical chemistry and physico-chemical methods of analysis

CHAPTER I:

The steam equipment of Galeno-pharmaceutical units. Types of modern boilers and their structures.

CHAPTER II:

Drug material crushing machines. Types of mills for pulverizing crushed stone (The mold and hammer mill).

CHAPTER III:

Gas transfer equipment (compressors, vacuum pumps, fans.

CHAPTER IV:

Equipment for moving liquids and solids (siphons, jet pump, centrifugal pump, elevators, pneumatic conveyors)

CHAPTER V:

Equipment for mixing liquids in the pharmaceutical industry (type of agitators, pneumatic mixing: bubbling)

CHAPTER VI:

Equipment for the separation of solids and liquids (clarifiers. Vacuum presses, hydraulic presses, screw presses).

CHAPTER VII:

Apparatus for the evaporation and drying of medicated bodies (vacuum vaporizer, condenser, types of air dryers, infrared dryers, belt dryer etc.)

CHAPTER VIII:

Machines for tablets, the device for powdering.

CHAPTER IX:

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EMode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

Review: 100%

References;(Books and handouts, websites, etc.).quipment for determination of hardness and disintegration of tablets.

Intitulé du Master : Chimie Pharmaceutique

Semester : 1

Title of the EU: UEM 1.1

Intitulé de la matière : Laboratoire I

Credits: 04

Coefficients:02

Teaching objectives:

- Acquire practical skills in different training subjects and improve the experimental and industrial spirit.

Prerequisite knowledge recommended (brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

General chemistry, organic chemistry, physico-chemical methods of analysis

- Analytical chemistry, biochemistry,....etc

Practical work that has a relationship with the content of different teaching subjects of semester 1

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 100%

References (Books and handouts, websites, etc.).

Intitulé du Master : Chimie Pharmaceutique

Semestre : 1

Intitulé de l'UE : UED 1.1

Intitulé de la matière : Chimie verte

Credits: 01

Coefficients: 01

Teaching objectives:

Importance of chemistry of natural substances as an alternative to chemistry synthetic and this, for a sustainable development

Recommended prerequisites:

General Chemistry

Content of the subject:

The different principles and fields of application of green chemistry.

Mode d'évaluation : Contrôle continu, examen, etc...(La pondération est laissée à l'appréciation de l'équipe de formation)

Examen : 100%

Références (Livres et photocopiés, sites internet, etc)

Title of the Master: Pharmaceutical Chemistry
Semester: 1
Title of the teaching unit: UET 1.1
Title of the subject: Language and communication I
Credits: 02
Coefficients:02

Objective:

Learning a language like English is necessary for the student in his career to enable him to document, understand and follow scientific news.

Recommended prerequisites:

Basic English

Contents:

- General introduction.
- English text structure.
- General chemistry glossary.
- Laboratory description.
- Scientific Experiment description.
- Write a scientific experiment resume.
- Materials classes' description and scientific references.
- Materials science and engineering key words.
- Reading a scientific paper.

Assessment method:

100% Exam

Bibliographical references:

1. Robert A. Day « Scientific English: A Guide for Scientists and Other Professional», Oryx Press, 1995 [2] Jack P. Hailman, Karen B. Strier « Planning, Proposing and Presenting Science Effectively: A Guide for Graduate Students and Researchers in the Behavioral Sciences and Biology», Cambridge University Press, 2006

Title of the Master: Pharmaceutical Chemistry

Semester: 2

Unit title: UEF 2.1

Subject title: Pharmaceutical Chemistry II

Credits: 04

Coefficients: 02

Teaching objectives:

- Most of the course will consider the optimization of the guide structure in terms of power of action, selectivity and safety of use, all from the pharmacodynamic and pharmacokinetics (the continuation of the pharmaceutical chemistry I course).

Recommended prior knowledge

- Organic chemistry and pharmaceutical chemistry I

Part Two: ORGANIC MEDICINES (continued)

B-: Aromatic medicinal preparations

CHAPTER I: Pharmacological effect of aromatic compounds

CHAPTER II: Drug preparations of phenol and its derivatives

CHAPTER III: Medicinal preparations of aromatic acids and their derivatives: esters, acetamides, sulfonamides, aminophenols, salts

CHAPTER IV: Medicinal preparations of aromatic amino acids and their derivatives

CHAPTER V: Medicinal preparations of the class of metallorganic compounds

CHAPTER VI:

- Drug preparations of the terpene class.
- Heterocyclic medicinal preparations.
- Medicinal preparations of the class of quinoline, pyrimidine, benzothiadiazine and phenothiazine.

Part Three: MEDICINAL PREPARATIONS BASED ON BIOLOGICALLY ACTIVATED SUBSTANCES

CHAPTER I: Alkaloids

CHAPTER II: Hormones and pseudohormones

CHAPTER III: Vitamins

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Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%, Review: 67%

Références (Livres et photocopiés, sites internet, etc).

- [1] VG Belikov. « Traité de Chimie pharmaceutique ».
- [2] P.Lebeau. « Traité de Pharmacie Chimique ».
- [3] H.Gherib. « Chimie Organique Pharmaceutique ».
- [4] F.Dorvault. « L'officine ».
- [5] J.Leboulanger. « Les vitamines ».
- [6] F.Pellerin. « L'étude de la stabilité des médicaments ».
- [7] R.Bentefac. « Les essais de stabilité sur les principes actifs et les produits finis ».
- [8] Larousse. « Nouveau Larousse Médical ».
- [9] A.V. Elston. « Synthèse des produits intermédiaires et des colorants ».
- [10] B.V. Passet. « Précis d'analyse technique et du contrôle de production des préparats Chimico-pharmaceutiques et des antibiotiques ».
- [11] J.D. Roberts. « Chimie Organique moderne

Title of the Master: Pharmaceutical Chemistry

Semester: 2

Unit title: UEF 2.1

Subject title: Chemistry of natural substances

Credits: 04

Coefficients: 02

Teaching objectives:

The aim of the course is to introduce students to the main classes of terpenes and steroids, their biosyntheses, hemi syntheses and total syntheses, evolutions of these and the transformations that the various products may undergo; their biological properties will also be presented.

Recommended prior knowledge:

- Organic chemistry

Content of matter

1. Notions of biosynthetic pathways

2. Origin of metabolites

- Metabolic pathways

- Primary metabolites

- Secondary metabolites

3. Use of enzymes

- Use of raw enzymes

- Use of purified enzymes

- Enzymatic stereoselectivity

- Enzymatic kinetics

- Genetic aspects

4. Application to major classes of natural products

- Polyketides – Peptides – Terpenes – Lipids – Steroids - Alkaloids

- Sugars – Prostaglandins

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry

Semester: 2

Unit title: UEF 2.1

Title of the subject: Technology of drugs II

Credits: 04

Coefficients: 02

Teaching objectives:

Object and methods of drug technology (the continuation of the program of the subject drug technology I).

Recommended prior knowledge:

- General Chemistry and Drug Technology I

Content of the subject

CHAPTER I:

I.1. Technical requirements for forms of medicinal products.

I.2. Classification of medicinal forms.

I.3. Drug dosage option.

CHAPTER II:

II.1. Forms of solid drugs. The powders.

II.2. Stages of the powder manufacturing process.

II.3. Simple and complex powders.

II.4. Dosed and non-dosed powders.

CHAPTER III:

III.1. Tablets. Theoretical bases of the preparation of tablets.

III.2. Study of the physico-chemical parameters of the tablets.

III.3. Granulation. Drying and treatment of granules.

III.4. Use of excipients during the production of tablets.

III.5. Covering of the tablets by a membrane and film.

III.6. Tablet testing and storage.

CHAPTER IV:

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

- IV.1. Forms of liquid drugs. True solutions.
- IV.2. Preparation of solutions and their control and storage.
- IV.3. Preparation of injection solutions.
- IV.4. colloidal solutions. Solutions for the eyes.
- IV.5. Suspensions and emulsions.
- IV.6. General questions of production of liquid drugs.
- IV.7. Technological schemes.

CHAPTER V:

Ointments. Method of preparation of ointments on the basis of hydrophilic substances and hydrophobic.

CHAPTER VI:

- VI.1. Plasters (sinapism) and poultice. Medical pencils. Capsules (evules).
- VI.2. Drugs prepared under aseptic conditions.
- VI.3. Ampoules and their preparation. Sterilization of bulbs.

CHAPTER VII:

- VII.1. Packing and packaging of drugs and galenic preparations.
- VII.2. Packaging of liquids and enguents (ointments), powders, tablets and dragees.

Mode of assessment:

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

- [1] A. Le Hir. "Abstract of Galenic Pharmacy".
- [2] F. Dorvault. "The Office".
- [3] F. Pellerin. "The study of the stability of drugs".
- [4] R.Bentefac. "Stability tests on active ingredients and finished products".
- [5] Vogel's. "Textbook of practical Organic Chemistry".
- [6] D.Pradeau. "Practical analysis of the drug".
- [7] A.Lespañol. "Precis of usual chemical pharmacy".
- [8] Chemakine. "Chemistry of Antibiotics". Volume1 and Volume2

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry**Semester: 2****Unit title: UEF 2.1****Subject title: Metabolic biochemistry****Credits: 03****Coefficients: 1.5****Teaching objectives:**

Metabolisms of carbohydrates, proteins, lipids, the Chemistry of the blood and the Chemistry of urine.

Recommended prior

- Organic chemistry and structural biochemistry

Content of the subject**CHAPTER I:**

I.1. Metabolic relationships: anabolism, catabolism, biochemical chain, metabolism of substances and energy: Krebs cycle, main pathways of ATP accumulation and utilization. Intermediate metabolism.

CHAPTER II:

Carbohydrate metabolism: digestion and absorption, essential carbohydrate breakdown pathways, breakdown anaerobic and aerobic oxidation, regulation and pathology of carbohydrate metabolism.

CHAPTER III:

III.1. Lipid and lipid metabolism: digestion and absorption, transformation of neutral fatty acids in the tissues, oxidation.

III.2. Intermediate phospholipid metabolism regulation and pathology of lipid and lipid metabolism.

CHAPTER IV:

IV.1. Simple protein metabolism: nitrogen balance, body protein reserves, digestion and absorption of proteins, putrefaction of proteins in the intestines, intermediate metabolism of amino acids: protein biosynthesis, deamination, decarboxylation, reductive amination.

IV.2. Synthesis of urea. Individual amino acid metabolism.

IV.3. Complex protein metabolism

IV.3.1. Nucleoproteins

IV.3.2. Chromoproteins

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

IV.3.3. Breakdown of hemoglobin in the tissues.

IV.4. Pathology of simple and complex protein metabolism.

CHAPTER V:

V.1. Relation between the metabolism of carbohydrates, proteins and lipids:

V.2. Relationship between carbohydrate and lipid metabolism, glycogen and triglyceride metabolism.

V.3. Relationship between carbohydrate and protein metabolism and between protein and lipid metabolism.

CHAPTER VI:

Mineral and aqueous metabolism:

VI.1. Homeostasis

VI.2. Osmotic pressure

VI.3. Medium pH, buffer systems

VI.4. Regulation of aqueous metabolism

VI.5. Mineral requirements

VI.6. Importance of mineral elements.

CHAPTER VII:

VII.1. Blood chemistry

VII.1.1. Chemical composition

VII.1.2. Non-protein nitrogenous substances in the blood, non-nitrogenous substance

VII.1.3. Uniform elements of blood, coagulation.

CHAPTER VIII:

VIII.1. Urine chemistry:

VIII.1.1. Physico-chemical properties

VIII.1.2. Chemical composition

VIII.1.3. Pathology of the constituent parts of urine.

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%, Review: 67%

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Références (Livres et photocopiés, sites internet, etc).

Title of the Master: Pharmaceutical Chemistry
Semester: 2
Unit title: UEF 2.1
Subject title: General and industrial microbiology
Credits: 03
Coefficients: 1.5

Teaching objectives:

- Definition and object of microbiology, Classification of microorganisms, environments of culture, fermentation products.....

Recommended prior knowledge:

- Organic chemistry, structural biochemistry and metabolic biochemistry

Content of the subject:**CHAPTER I:**

Introduction: Definition and object of microbiology.

CHAPTER II:

II.1. Classification of microorganisms.

II.2. Morphology of microorganisms. Morphology of bacteria.

II.3. Structure of bacterial cells. Reproduction of bacteria.

II.4. the mushrooms. Viruses and phages

II.5. The structure of the bodies of fungi. Leavens.

II.6. Chemical composition.

II.7. Role in the natural cyclic process.

II.8. Microbes in the human body and in medicinal plants

CHAPTER III:

III.1. Influence of environmental factors on microorganisms.

III.2. Use of microorganisms in technology (in industry).

CHAPTER IV:

IV.1. Definition of industrial fermentations.

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

IV.2. Search for new strains

IV.3. Secondary metabolism. Storage of strains.

CHAPTER V:

V.1. Culture media. Sources of carbon, nitrogen.

V.2. Growth factor.

V.3. Mineral salts. Preparation of the medium. Sterilization.

V.4. Sensitivity of microorganisms to heat, constant temperature.

V.5. Preparation of the inoculum.

CHAPTER VI:

VI.1. The conditions of fermentation and extraction of the products.

VI.2. Control of environmental conditions. Aeration and agitation.

VI.3. Control of foam formation. pH regulation.

VI.4. Main types of crops. Culture of microorganisms by dialysis.

VI.5. Use of the metabolic properties of fungal and streptomyces spores.

VI.6. Extraction of the desired products. Extraction by solvents.

VI.7. Adsorption, precipitation. Use of membranes.

CHAPTER VII:

VII.1. Microbial proteins. Substrates used. Cultivation conditions.

VII.2. Hydrogen, methane bacteria. Yeasts.

VII.3. Filamentous fungi. Algae.

CHAPTER VIII:

VIII.1. fermentation products. Primary metabolism: alcohols and ketones (industrial solvents), organic acids: citric, itaconic.

VIII.2. Vitamins: vitamin B12, amino acids, glutamine acid.

VIII.3. Nucleotides, polysaccharides.

VIII.4. Enzymes: use and sources of enzymes of microbial origin; amylase, beta-galactosidase (lactose), glucose, isomerases, proteases, lipases, oxidase and catalase.

VIII.5. Medical application of microbial enzymes.

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

VIII.6. Industrial obtaining of antibiotics: penicillin, tetracycline, bacitracin, streptomycin, oxytetracycline etc...

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.)

- [1] M.Bliss. "Medicine and Society".
- [2] Lavoisier. "Toxicology and Safety".
- [3] Pelmont. "Enzymes".
- [4] Pelmont. "Bacteria and the environment".
- [5] A. Meyer. "General microbiology course".
- [6] H. Leclerk. "Applied Microbiology".
- [7] N.S. Egorov. "Industrial Microbiology".
- [8] A.L. Lehnindjer. "The molecular basis of cell structure and Funch

Title of the Master: Pharmaceutical Chemistry
Semester: 2
Title of the EU: EMU 2.1
Title of the subject: Physicochemical methods of analysis II
Credits: 02
Coefficients: 1

Teaching objectives:

- Acquire skills in chemical and physical analysis methods(characterize and identify chemicals, etc.).

Recommended prior knowledge:

- Organic chemistry, analytical chemistry and mineral chemistry. - Physico-chemical methods of analysis I

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

CHAPTER I: Chemical Methods

1 Titrimetric methods:

- o Acid-base titration
- o Complex titration in solution
- o Redox titration

2 Gravimetric methods:

- o Precipitation from homogeneous solution

CHAPTER II:

Electrochemical instrumental methods

1. Conductimetry
2. Polarography
3. Amperometry
4. Potentiometry
5. Coulometry

CHAPTER II:

Thermal methods

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

1. Calorimetric analysis
2. Differential thermal analysis
3. Thermogravimetry analysis.

CHAPTER IV:

Electronic circuits in analytical instruments.

CHAPTER V:

Analytical instrumentation computers

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.)

Title of the Master: Pharmaceutical Chemistry**Semester: 2****Title of the EU: EMU 2.1****Subject title: Kinetics catalysis and electrochemistry****Credits: 03****Coefficients: 02****Teaching objectives:**

- At the end of this module, the student must know how to implement the main study methods kinetics, catalysis and electrochemical systems and interpret their results.

Recommended prior knowledge

- Chemical kinetics, surface chemistry and electrochemistry

Content of the subject

- Elements of experimental chemical and electrochemical kinetics. - Methods of study of electrochemical systems. - Thermodynamics of electrochemical reactions
- Electrochemical balances
- Oxidation-reduction balances
- Potential-pH or E-pH equilibrium diagrams
- Thermodynamic prediction of electrochemical reactions
- Non-equilibrium electrochemical systems
- Linear systems: Reminders
- Electrochemical regulations
- Transfer function analyzers - Use of AFT in electrochemistry
- Voltammetry
- Electrical test circuits - Modeling elements of electrode reactions
- Support electrolyte, rotating disk electrode - Principle of measurement of kinetic parameters
- Ferri-ferrocyanide system in static regime
- Study of the Ferry-ferro cyanure system by SIE
- Voltammetry

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

- * Precis of electrochemical thermodynamics and kinetics, J. BESSON, Edition marketing, Paris, 1984,
- * Electrochemical kinetics, DIARD J-P, LE GORREC C., MONTELLA C., Hermann Publisher, 1996, ISBN2
- * Exercises in electrochemical kinetics, MONTELLA C., DIARD J-P., LE GORREC B., HermannEditor, 2000, Physicochemical Hydrodynamics, LEVICH V.G., PRENTICE-HALL, ENGLEWOOD

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry

Semester: 2

Title of the EU: EMU 2.1

Subject title: Laboratory II

Credits: 04

Coefficients: 02

Teaching objectives:

- Acquire practical skills of different subjects of the training and improve the experimental and industrial spirit.

Recommended prior knowledge:

- Practical work, analytical chemistry.....

Content of the subject:

- Practical work that has a relationship with the content of different subjects lessons for semester 2.

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 100%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry

Unit title: UED 2.1

Subject title: Toxicology and industrial safety

Credits: 01

Coefficients: 01

Teaching objectives

- Assess the risks in industrial environments and know the measures necessary for protection.

Recommended prior knowledge

- General chemistry and organic chemistry

Content of the subject

I. Risk assessment

II. Fire and explosions

III. Chemical substances

IV. Sound effects.

V. Effects of radiation.

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry
Semester: 2
Unit title: UET 2.1
Title of the subject: Language and communication II
Credits: 02
Coefficients: 02

Teaching objectives

- Understand, produce and interact in professional and scientific English.

Recommended prior knowledge

- English

Content of the subject

WRITING

- Write reports and summaries.
- Master specialized terminology

Professional English - Simulations of situations experienced in the world of work (meetings, presentations, interviews, telephone...) - writing letters and CVs

Scientific English

- Presentations / scientific talks.
- Summaries, arguments and debates.
- E-learning

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.)

Title of the Master: Pharmaceutical Chemistry**Semester: 3****Unit title: UEF 3.1****Subject Title: Drug Analysis and Control****Credits: 05****Coefficients: 03****Teaching objectives**

- Quality control of medicines in pharmacies.

Recommended prior knowledge

- Physicochemical methods of analysis

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

CHAPTER I:

I.1 .Notion of state system structure in drug quality control. Order of elaboration of the technical documentation of standards.

CHAPTER II:

Drug control system in the management of pharmaceutical chemistry enterprises. Quality control of drugs in pharmacies.

CHAPTER III:

III.1. Peculiarities of pharmaceutical analysis and essential criteria.

III.2. General Principles of authenticity of medicinal substances.

CHAPTER IV:

IV.1. Types of technical analysis in a pharmaceutical complex.

IV.2. Technical organization of laboratory work.

IV.3. Peculiarities of carrying out laboratory work.

IV.5. Presentation of documentation in the laboratories of the complexes.

IV.6. General Work rules in technical analysis laboratories.

IV.7. Work safety rules when handling explosive/toxic combustible substances.

CHAPTER V:

V.1. Choice of sample during drug analysis.

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

V.2. General Rules. Types of samples.

V.3. Sample selection of drugs packaged in bulk; wholesale; of solid substances.

V.4. Choice of samples of liquid drugs, injectable solutions, vegetable matter.

V.5. Packaging, marking and preservation of samples.

CHAPTER VI:

VI.1. Sterilization. Methods of sterilization; thermal sterilization: using steam or air. Sterilization chemical: using gas or a solution. Sterilization by filtration and by radiation.

CHAPTER VII:

VII.1. Dosage of ashes. Assays of ashes not soluble in HCL.

VII.2. Dosage of sulphate ash. Determination of the activity of fermented compounds.

VII.3. Dosage of proteins in these compounds.

CHAPTER VIII:

VIII.1. Physical method for the analysis of chemical preparations in pharmacy.

VIII.2. Determination of external form, odor, and color of substances medicated.

VIII.3. Determination of the density of liquids.

VIII.4. Determination of melting, solidification and boiling point.

VIII.5. Determination of water content.

VIII.6. Determination of the refractive index, of the optical rotational power of liquid medications.

CHAPTER IX:

IX.1. Chemical methods of technical analysis of raw materials, semi-finished products and pharmaceutical preparations.

IX.2. Titrimetric methods

IX.3. Determination of functional groups.

IX.4. Identification of functional groups.

IX.5. analytical characteristics of fats: acid index, saponification index, iodine index, ester index.

CHAPTER X:

Physico-chemical methods of drug analysis

X.1. Electrochemical methods: potentiometric, conductometric and polarographic analysis

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

X.2. Spectral methods:

X.3. Chromatographic methods: column, thin layer, paper, gas phase and liquid.

CHAPTER XI:

Analysis and control of pharmaceutical preparations of the aliphatic series

XI.1. Analysis of halogenated derivatives.

XI.2. Analysis of alcohols and ethers.

XI.3. Analysis of urea derivatives.

CHAPTER XII:

XII.1. Analysis and control of pharmaceutical preparations of the aromatic series:

XII.2. Analysis of phenol and aniline derivatives

XII.3. Analysis of benzoic acid and its derivatives

XII.4. Analysis of salicylic acid and its derivatives

CHAPTER XIII:

XIII.1. Analysis and control of heterocyclic pharmaceutical preparations with a single heteroatom

XIII.2. Analysis of pyridine derivatives

CHAPTER XIV:

Analysis of alkaloids; Analysis of penicillin and streptomycin

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

[1] A.Lespañol. "Chemistry of Medicines".

[2] V.G. Belikov. "Treatise on Pharmaceutical Chemistry".

[3] M.N. Nabiev. Obtaining, analyzing and identifying drugs".

[4] R.C. Osland. "Principles and Practices of Infrared Spectroscopy".

[5] R.Poludek. "Organic Analysis".

[6] Duval. "Engineering Techniques. Modern methods of chemical analysis".

[7] Vogel's. "Text Book of Practical Organic Chemistry

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry**Semester: 3****Unit title: UEF 3.1****Subject title: Heterocyclic Chemistry****Credits: 05****Coefficients: 02****Teaching objectives:**

- Acquire basic knowledge of the main classes of heterocycles (pyrrole, thiophenes, furans, indoles, pyridines, quinolines, oxazoles and related compounds), constituent elements of a large number of substances of natural and medicinal origin.

Recommended prior knowledge

- Organic chemistry

Content of the subject**1: heterocyclic synthesis**

- Reminders on heterocycles: structure, properties, classical syntheses.
- Modern methods for heterocyclic synthesis: new intermediates reactions, cycloadditions, metal-catalyzed reactions.

2: heterocycle couplings

- Reminders on organometallic couplings: Heck, Stille, Suzuki reactions, Negishi, Kumada and related reactions. Pallado-catalyzed reactions and alternatives with other metals.
- Application of organometallic coupling reactions in heterocyclic chemistry and in the synthesis of bioactive molecules.

3: anionic chemistry of heterocycles

- Metallation of heterocycles: reactivity and selectivity.
- Applications in synthesis of complex heterocyclic compounds and molecules bioactive.

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33% , Review: 67%

References (Books and handouts, websites, etc.).

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry

Semester: 3

Unit title: UEF 3.1

Subject title: Macromolecular Chemistry

Credits: 04

Coefficients: 02

Teaching objectives

- Introduce students to macromolecular chemistry

Recommended prior knowledge

- Organic chemistry

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

1- General introduction: The main families of polymers and their applications

2- Polymer synthesis methods: Chain polymerizations: radical, ionic (cationic, anionic). Polycondensations. Polymerization methods "heterogeneous"

3- Characterization of macromolecules and behavior in solution: Analysis structural. Behavior in solution: Solvation, Hydrodynamic volume.

Viscosity (rheology) of polymer solutions. Average molar masses (definitions and methods of determination)

4- Thermal and mechanical behavior of polymers: Amorphous polymers, semi-crystalline, crystalline. Thermal behavior: Phase transitions. Viscoelasticity, mechanical behavior

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry

Semester: 3

Unit title: UEF 3.1

Subject title: Pharmaceutical Botany

Credits: 04

Coefficients: 02

Teaching objectives

- Develop the ability to identify and control fresh plants. Value the natural substances of plant origin for the pharmaceutical, cosmetic and food industries.

Recommended prior knowledge

- Pharmaceutical Chemistry I and II

Content of the subject

Knowledge of Languedoc-Roussillon plants (medicinal, food, useful).

Herborisations (garrigue, lido and sansouire, Aigoual massif). Realization of herbarium (plants collected in herborization) and poster (choice of a plant theme by the students). Exhibitions of fresh plants. Botanical gardens. Conferences and debates with industry professionals. Activities Plants: professional integration and partnership.

Mode of assessment: Continuous assessment, examination, etc. (The weighting is left to appreciation of the training team)

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry**Semester: 3****Unit title: EMU 3.1****Subject title: Statistics and optimization****Credits: 04****Coefficients: 02**Teaching objectives

- Make the best use of the statistical tool in the processing of laboratory data with pharmaceutical direction. It proposes to give the lines of conduct (guidelines) of the various statistical treatments in order to extract a maximum of information from the experimental data.

Recommended prior knowledge

- Numerical analysis and methods

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

Statistics applied to clinical research

- Principle of comparative effect
- Experimental plan (see appendix)
- Conduct of the study
- Analysis and interpretation of results

Statistics applied to pharmacokinetics

- Independent model
- Pharmacokinetic modeling
- Determination of ED50 by the Litchfield-Wilcoxon method

Statistical methods in industrial galenics

- Quality control
- Stability studies
- Dissolution tests
- Bioequivalence
- In vivo and in vitro correlation

Statistical methods in biochemistry (statistical analysis of nonlinear phenomena)

- General
- Link studies
- Enzymatic kinetic studies
- Statistical methods in analytics

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Calibration methods

- Linear calibration
- Nonlinear calibration
- Determination of outliers

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry**Semester: 3****Unit title: EMU 3.1****Subject title: Electrochemical analysis****Credits: 03****Coefficients: 02****Teaching objectives**

- Know the principle of the different Electrochemical Techniques and their applications.

Recommended prior knowledge

-Fundamental electrochemistry, analytical chemistry

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work

I- Reminders

Thermodynamics: ions in solution, chemical potential, notion of interface, potentiostat, electrochemistry, Nernst equation, Potentiometry, Batteries, Electrolyzers.

II – Transport in solution

- Conductivity of electrolytes. Ion mobility
- Phenomena of transport in solution: migration, diffusion and convection
- Stationary intensity-potential curves:
- Kinetic aspect: limitation by heterogeneous electron transfer
- Limitation by transport phenomena
- Exploitation of I-E curves
- Properties of solvent media used in electrochemistry

III-Instrumentation

- Electrochemical equipment
- The cell
- The ohmic drop: compensation by power cut and reinjection
- Capacitive current

IV – Classic Electrochemical Techniques

- Potentiometric techniques
- Amperometric techniques
- Voltamperometric techniques
- Electrochemical impedance spectrometry
- Conductometric assays

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Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

- Potentiometer
- Polarography
- Battery voltage measurement
- Electrolysis

V – Electrochemical sensors

- Biosensors: enzyme and immunological electrodes
- Industrial applications and R&D

- Miniaturization:

- Ultra-Microelectrodes

o Integration of detectors in microsystems (interests, constraints)

Mode of assessment: Continuous assessment, examination, etc.

C. Continuous: 33%, Review: 67%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry

Semester: 3

Unit title: EMU 3.1

Subject title: Environmental chemistry and pollution control

Credits: 02

Coefficients: 01

Teaching objectives

- Discover the issues linking the environment to health.
- .Know the major risks.
- Know the methods of risk assessment and prevention

Recommended prior knowledge

- General chemistry, organic chemistry and mineral chemistry

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

GENERAL INTRODUCTION

Notions of ecosystems, interdependence, physicochemical and biological properties toxicological

WATER

Water quality and water composition

Regulations

Nitrites, nitrates, total nitrogen, organic nitrogen... Ions, metals, pH, alkalinity, conductivity, suspended solids, pesticides...

Water analysis and control

Water treatment: coagulation, flocculation... disinfection...

AIR

Regulations - Composition - Pollutants

Air treatment: acid gas treatment, CO₂ capture, VOC treatment

Alternatives to CFCs. The actions of CFCs on the ozone layer

FLOOR

Characteristics of a soil

Contamination by industrial discharges and additions agrochemicals, by spreading sludge. Soil decontamination

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.)

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

Title of the Master: Pharmaceutical Chemistry

Semester: 3

Unit title: UED 3.1

Title of the subject: Management, management and strategy of research and development in the pharmaceutical industry

Credits: 01

Coefficients:01

Teaching objectives

- The activities deployed in this field aim to transfer a molecule from stage of active chemical substance to that of pharmaceutical specialty possessing the characteristics ensuring the optimal therapeutic effect.

Recommended prior

- Pharmaceutical chemistry, pharmacology.

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

Part 1: PRODUCTION ORGANIZATION

1. The production sector of the pharmaceutical industry
 - place of production in the company, location, workforce
2. Technical approach to production
 - homeopathic forms;
 - ophthalmic forms;
 - medical gases;
 - Production in the cosmetology sector.
3. Production management (depending on the availability of the industrial operator)
 - project management;
 - Planning of manufacturing campaigns (organization of supply, exploitation cost...).
4. Analytical and budgetary accounting
 - analytical structuring of the company;
 - measurement of activities and entry of charges;
 - costing models;
 - budget construction and variance analysis

Part 2: research and development strategy

1. New Drug Entity Discovery Process
2. Pre-clinical development process (pharmacology, toxicology, pilot production)

Institution: Djilali Bounaâma University of Khemis Miliana

Title of the master: Pharmaceutical Chemistry - Academic year: 2022/2023

3. Clinical development process (phases I, IIa, IIb, IIIa, IIIb, IV)
 4. Compilation of the registration dossier and relations between industry and public authorities
 5. Pharmaco vigilance
 6. The design, production and marketing phases of the pharmaceutical specialty will be reviewed by briefly illustrating current events in each of these three areas, highlighting current challenges and some perspectives. The roles what the holder of a pharmacist degree can play there will be illustrated
 7. Modern pharmaceutical forms will be reviewed, focusing on the practical and recent examples and highlighting the advantages and limitations of different approaches
 8. Galenic development activities will be described; they go through three phases successive: elaboration, experimentation and realization which are based on three type's activities: pre formulation, formulation and process
- One of the main responsibilities of pharmaceutical development is the packaging of pharmaceutical forms intended for clinical investigation

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.).

Title of the Master: Pharmaceutical Chemistry
Semester: 3
Unit title: UET 3.1
Subject title: English and scientific documentation
Credits: 02
Coefficients: 02

Teaching objectives

- Understand a scientific article published in English.

Recommended prior knowledge

- English

Content of the subject (mandatory indicate the detailed content of the program in face-to-face and personal work)

o Scientific articles published in English and related to chemistry pharmaceutical and the use of natural substances

Mode of assessment: Continuous assessment, examination, etc.

Review: 100%

References (Books and handouts, websites, etc.)

