

| Course Unit      | Pharmacognosy |               |   | Field of study                                  | Pharmacy  |   |  |
|------------------|---------------|---------------|---|---|---|---|--|
| Bachelor in      | Pharmacy      |               |   | School  | School of Health                                |   |  |
| Academic Year    | 2022/2023     | Year of study | 2   | Level   | 1-2   | ECTS credits                                | 5.0  |
| Туре             | Semestral     | Semester      | 1   | Code  | 9549-644-2101-00-22                             |   |  |
| Workload (hours) | 135           | Contact hours | T - TP :<br>T - Lectures; TP - Lectures a | 30 PL 30 T<br>nd problem-solving; PL - Problem- | C - S -<br>solving, project or laboratory; TC - | E - OT<br>Fieldwork; S - Seminar; E - Place | 7,5 O -<br>ement; OT - Tutorial; O - Other |

#### Name(s) of lecturer(s)

Joana Andrea Soares Amaral

Learning outcomes and competences

- At the end of the course unit the learner is expected to be able to: 1. Characterize the chemistry of primary and secondary metabolites derivatives from acetate, shiquimate and mevalonate pathways with biological activity or pharmaceutical technological value.
- To identify different plants characterized by the presence of different secondary metabolites; To identify different plants characterized by the presence of different secondary metabolites; To know techniques of determination and standardization of plants active constituents as well as their major pharmaceutical applications To know extraction techniques of natural products with biological activity or pharmaceutical technological value

### Prerequisites

Not applicable

#### Course contents

Pharmacopoeias. Plants used in herbal medicine characterized by the presence of sugars and derivatives of acetate and shikimate pathways. Chemical composition, extraction and pharmacological properties of derivatives of acetate, shikimate and mevalonate pathways.

#### Course contents (extended version)

- 1. Pharmacopoeias

- Pharmacopoeias.
   Plants used in herbal medicine characterized by the presence of sugars

   Homogenous polyholosides from higher plants (starch and cellulose)
   Homogenous polyholosides from shelfish (chitin and chitosan)
   Homogenous polyholosides from bacteria (dextrans)
   Heterogenous polyholosides (gums, polysaccharide mucilage from seaweed and from higher plants)

   Plants used in herbal medicine characterized by the presence of derivatives of acetate pathway

   Quinones. Naftoquinones. Laxative anthraquinones
   Anthracene derivatives: biosynthesis, glycosilation and pharmacological activity, dimerization

   Anthracene derivatives: physico-chemical properties, therapeutic use and contraindications

   Plants used in herbal medicine characterized by the presence of derivatives of shikimate pathway

   Simple phenolics and phenolic acids

  - Simple phenolics and phenolic acids
  - Salicylates
- Sancyrates
   Coumarins. Coumarins and anticoagulant activity
   Furanccoumarins: toxicity, applications in PUVA therapy
   Flavonoids. Biossynthesis. Physico-chemical characteristics. Therapeutic and antioxidant uses
   Tannins. Hydrolysable and condensed tannins. Biologival properties and usefulness to man
   Chemical composition, extraction and pharmacological properties of derivatives of mevalonate pathway
   Escentral oile
  - Essential oils
  - Phytosterols Cardiotonics. Herbal drugs used for compounds isolation
- Saponosides
- Nitrogenous compounds

   Xanthines (caffeine, theophylline) and example of alkaloids.

### Recommended reading

- Heinrich, M., Barnes, J., Gibbons, S., Williamson, E. M. (2006). Fundamentals of Pharmacognosy and Phytotherapy. Edinburgh: Churchill Livingstone.
   Cunha, A. P. (2005). Farmacognosia e Fitoquímica. Lisboa: Fundação Calouste Gulbenkian.
   Bruneton, J. (2001). Farmacognosia, Fitoquímica, Plantas Medicinales (2ª Ed). Zaragoza: Acribia.
   Cunha, A. P. (2006). Plantas e Produtos Vegetais em Fitoterapia. Lisboa: Fundação Calouste Gulbenkian
   Costa, A. F. (2001). Farmacognosia. Lisboa: Fundação Calouste Gulbenkian.

# Teaching and learning methods

Theoretical Classes: Lectures of theoretical contents. Practical classes: Guided searching into pharmacopeias and scientific databases. Individual and team case studies. Laboratory classes: performance of laboratorial classes and experimental protocols.

## Assessment methods

- Alternative 1 (Regular, Student Worker) (Final)

   Intermediate Written Test 25% (Theoretic-pratical test.)
   Work Discussion 15% (Oral presentation and discussion of a group bibliographic research work.)
   Intermediate Written Test 30% (Theoretical component. Minimum grade: 7. 5 values)
   Final Written Exam 30% (Theoretical component. Minimum grade: 7. 5 values)

   Alternative 2 (Regular, Student Worker) (Supplementary, Special)

   Final Written Exam 25% (Realização de teste teórico-prático.)
   Final Written Exam 60% (Minimum grade: 7. 5 values)
   Work Discussion 15% (Oral presentation and discussion of a group bibliographic research work.)

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# Language of instruction

1. Portuguese 2. Portuguese, with additional English support for foreign students.

| Electronic validation      |                          |                          |                                       |  |
|----------------------------|--------------------------|--------------------------|---------------------------------------|--|
| Joana Andrea Soares Amaral | Olívia Rodrigues Pereira | Juliana Almeida de Souza | Adília Maria Pires da Silva Fernandes |  |
| 20-11-2022                 | 24-11-2022               | 28-02-2023               | 04-03-2023                            |  |