

## COURSE SYLLABUS

### 1. Identification

Code and title: QUP 154 – Biocatalysis and Enzymatic Technology

Professor: Roberta Bussamara Rodrigues

Level: Master and Doctorate

Credit hours: 2

Revised: August\_2019

### 2. Summary

Introduction to biocatalysis and enzymatic technology. Understanding and utilization of enzymatic reactions in processes. Isolation and purification of enzymes. Enzymatic kinetics studies with and without presence of inhibitors. Study of applications involving enzymes.

### 3. Objective

The objective is to provide knowledge about the use of enzymes in different applications. Review basic concepts of enzymology and the use of biocatalysts in reactions. And, at the end, the student should be able to choose a specific enzyme or enzyme complex, understand the reaction mechanism, select the best reaction medium focused on the reaction yield, and evaluate the stability and reuse of the biocatalyst.

### 4. Contents

- Introduction
- Production of Enzymes
- Isolation and Purification of Enzymes
- Enzymatic Activity
- Methods of Immobilization of Enzymes
- Enzymatic Kinetics and Inhibitors
- Enzymatic Reactors
- Biocatalysis in Non-Conventional Solvents
- Examples of Application of Enzymes

### 5. Assessment

Conducting a case study, discussion of scientific articles, preparation of a report about practical classes and oral presentation. The student, who obtains a final grade of A, B or C, awarded as per the list below, will be considered approved:

A: grade equal to or above 9.0

B: grade equal to or above 7.5 and below 9.0

C: grade equal to or above 5.0 and below 7.5

D: grade below 5

FF: lack of frequency

### 6. Methodology

Lectures, exercises lists, seminars and examinations.

## 7. Bibliography

- W. Aehle, "Enzymes in Industry - Production and Applications". John Wiley & Sons. USA. 2007.
- M. Coelho, A.M. Salgado, B.D. Ribeiro, "Tecnologia Enzimática". EPUB/FAPERJ. Rio de Janeiro. 2008.
- W. Schmidell, U.A. Lima, E.A. Aquarone, W. Borzani, "Biotecnologia Industrial – Engenharia Bioquímica". Edgard Blücher. São Paulo. 2001.
- J. Polaina, A.P. Maccabe, "Industrial Enzymes: Structure, Function and Applications". Springer. 2007.
- A. Arya, A. Kumar, J. Jha, "Understanding Enzymes: An Introductory Text". Paperback. 2018.
- M. Ralph, "Immobilized Enzymes for Industrial Reactors". Academic Press. 1975.
- J. Guisan, "Immobilization of enzymes and cells". Imprenta Totowa: Human Press. 2006.