

- 3 Capacity to critically reflect on experimental data and the results obtained, and identify problems and propose strategies for their resolution.
- 4 Elaborate a scientific report with the results obtained organized, present and discussed in a clear and objective way.
- 5 At the end of this curricular unit students should be better prepared to develop lab work autonomously. Also, the evaluation requires that students establish basic notions about preparation of a scientific report and develop scientific communication and discussion skills.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Practicum, Group work, Guided self-study, Seminar, Lecture

Learning materials and price

- No additional cost
- Protocols, lectures and manuals are made available through the tutorial platform.
- Students are encouraged to use on-line resources from the Web of Knowledge or similar bibliographic databases.

References

- Rosano GL, et al. Recombinant protein expression in Escherichia coli: advances and challenges. *Front Microbiol.* 2014; 5:172.
- Uhoraningoga A, et al. The Goldilocks Approach: A Review of Employing Design of Experiments in Prokaryotic Recombinant Protein Production. *Bioengineering (Basel).* 2018 ;5 (4). pii: E89. doi: 10.3390/bioengineering5040089
- Recombinant Protein Purification Handbook Principles and Methods. Handbook from GE Healthcare Lifesciences, 2009.
- Protein sample preparation. Handbook from GE Healthcare Lifesciences, 2014. Affinity Chromatography-Tagged Proteins. Handbook from GE Healthcare Lifesciences, Volume 2, 2016.
- Proteins1.3 Efficient Strategies for Production of Eukaryotic Proteins. *Comprehensive Biophysics*, Volume 1, 2012, Pages 4-33 J.D.
- Freshney RI (2010) *Culture of Animal cells: A manual of basic technique and specialized applications*, 6th Edition, Wiley-Blackwell - John Wiley & Sons, Lda, ISBN: 978-0-470-52812-9.
- Cell Culture Basics Handbook (2016) Gibco™ Education © Thermo Fisher Scientific Inc.
- Crozier A, Clifford MN, Ashiara H. (2006) *Secondary Metabolites. Occurrence, Structure and Role in the Human Diet*, Blackwell Publishing Lda. ISBN: 13_978-1-4051-2509-3.
- Dewick PM (2009) *Medicinal Natural Products. A Biosynthetic Approach*, 3th Edition, John Wiley & Sons, Lda, ISBN: 978-0-470-74168-9

- Chandra, Suman, Latta, Hermant, Varma, Ajit (2013) *Biotechnology for Medicinal Plants*, Springer, ISBN: 978-3-642-29974-2.

Course content-related study coaching

Tutorials are provided as requested for coaching or problem resolution. 2h per week are set aside for resolution of problems students may have.

Assessment moments

continuous assessment

Examination methods in case of periodic assessment during the first examination period

Examination methods in case of periodic assessment during the second examination period

Examination methods in case of permanent assessment

Report, Participation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

Periodic evaluation is carried out at the end of the 3 modules

- 1 Plant bioactive compounds
- 2 Protein structure and function
- 3 Cell culture and biosensors

For evaluation of each module a practical report is presented and a seminar is given to present the work executed. The final mark is the average of the results from the 3 modules (40% scientific report: 40% laboratory work: 20% presentation and capacity to answer questions)

Calculation of the examination mark

The final discipline mark comes from the average of the marks obtained in the three module that compose the discipline.

Each module has 3 elements of evaluation

- 1 performance in the laboratory (40%);
- 2 scientific report (40%);
- 3 public seminar to present the results (20%)