# UNIVERSITÀ DEGLI STUDI DI PALERMO

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| **DEPARTMENT** | Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche | | |
| **ACADEMIC YEAR** | 2016/2017 | | |
| **BACHELOR'S DEGREE (BSC)** | BIOLOGICAL SCIENCES | | |
| **INTEGRATED COURSE** | CHEMICAL-PHYSICAL METHODS FOR BIOLOGICAL APPLICATIONS | | |
| **CODE** | 18657 | | |
| **MODULES** | Yes | | |
| **NUMBER OF MODULES** | 2 | | |
| **SCIENTIFIC SECTOR(S)** | CHIM/02 | | |
| **HEAD PROFESSOR(S)** | CHILLURA MARTINO DELIA FRANCESCA | Professore Ordinario | Univ. di PALERMO |
| **OTHER PROFESSOR(S)** | CHILLURA MARTINO DELIA FRANCESCA | Professore Ordinario | Univ. di PALERMO |
| | LOMBARDO RENATO | Ricercatore | Univ. di PALERMO |
| **CREDITS** | 6 | | |
| **PROPAEDEUTICAL SUBJECTS** | | | |
| **MUTUALIZATION** | | | |
| **YEAR** | 2 | | |
| **TERM (SEMESTER)** | 2° semester | | |
| **ATTENDANCE** | Not mandatory | | |
| **EVALUATION** | Out of 30 | | |
| **TEACHER OFFICE HOURS** | **CHILLURA MARTINO DELIA FRANCESCA**<br>Monday 15:00 16:00 Studio Prof. Chillura. Ed. 17 - Viale delle Scienze<br>**LOMBARDO RENATO**<br>Tuesday 10:00 12:00 Dipartimento STEBICEFStudio 1/B4, edificio 17, viale delle Scienze<br>Thursday 10:00 12:00 Dipartimento STEBICEFStudio 1/B4, edificio 17, viale delle Scienze | | |

**DOCENTE:** Prof.ssa DELIA FRANCESCA CHILLURA MARTINO

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| **PREREQUISITES** | The student must have a good knowledge of the basic contents of the chemistry, of the physics and of the mathematics. |
| **LEARNING OUTCOMES** | Students must acquire the tools for the design and application of spectroscopic methods.<br>At the end of the course students will have gained the ability to apply knowledge and skills to the correct data representation, elaboration and interpretation. |
| **ASSESSMENT METHODS** | The exam consists of an interview to ascertain the possession of skills and subject knowledge provided by the course. The candidate will have to answer at least three questions posed orally on all parts of the program.<br>Final assessment aims to evaluate whether the student has knowledge and understanding of the topics and has acquired interpretative competence and independence of judgment.<br>The candidate must be able to explain the basic concepts related to the physical principles underlying the spectroscopic methods, to the error propagation and to the regression of experimental data. He must know how to communicate in a clear and unambiguous manner, even to non-expert stakeholders, the knowledge gained.<br>The assessment is expressed in thirtieths.<br>The pass mark will be reached when the student shows knowledge and understanding of the issues at least in broad outline, and proves to be able to transpose the content in solving a real problem. the student must also have presentation and argumentative skills as to allow the transmission of his knowledge to the examiner. |
| **TEACHING METHODS** | The course is organized with lectures divided into two modules: a module that covers the basics of some spectroscopic techniques and a module that covers the statistical treatment of experimental data. |

## MODULE
## PRINCIPLES OF SPECTROSCOPY

*Prof. RENATO LOMBARDO*

**SUGGESTED BIBLIOGRAPHY**

Sheenan, D. Physical Biochemistry, 2nd ed., Wiley-Blackwell, Oxford, UK
Cooper, A. Biophysical Chemistry, 2nd ed., RCS Publishing, London, UK

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| **AMBIT** | 10665-Attività formative affini o integrative |
| **INDIVIDUAL STUDY (Hrs)** | 47 |
| **COURSE ACTIVITY (Hrs)** | 28 |

**EDUCATIONAL OBJECTIVES OF THE MODULE**

Provide basic knowledge of spectroscopic techniques both from a theoretical and applied point of view with particular regard to the research techniques commonly used in the field of the life sciences

## SYLLABUS

| Hrs | Frontal teaching |
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| 2 | Electrimagnetic radiation and its interaction with matter |
| 4 | UV/Vis spectroscopy |
| 2 | Fluorescence spectroscopy |
| 4 | Infrared spectroscopy |
| 4 | NMR spectroscopy |

| Hrs | Practice |
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| 12 | Exercises |

## MODULE
## DATA ANALYSIS AND REPRESENTATION

*Prof.ssa DELIA FRANCESCA CHILLURA MARTINO*

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| **SUGGESTED BIBLIOGRAPHY** | |
| Introduzione all'analisi degli errori. Lo studio delle incertezze nelle misure fisiche. John R. Taylor e S. Caporaloni. II Ed - Zanichelli Ed. | |
| **AMBIT** | 10665-Attività formative affini o integrative |
| **INDIVIDUAL STUDY (Hrs)** | 47 |
| **COURSE ACTIVITY (Hrs)** | 28 |
| **EDUCATIONAL OBJECTIVES OF THE MODULE** | |
| To provide the concepts of error and of error propagation. To provide knowledge about the methods of representation and regression of the experimental data. | |

## SYLLABUS

| Hrs | Frontal teaching |
|---|---|
| 4 | Uncertainty and experimental error. Relative uncertainty, significant figures. Uncertainty propagation |
| 4 | Statistical analysis of random uncertainties. The normal distribution. |
| 4 | Rejection of data. Weighted averages. Method of least squares. |
| 4 | Covariance and correlation. Distributions. |

| Hrs | Practice |
|---|---|
| 12 | Numerical exercises |