

COURSE OF STUDY (Pharmacy)

ACADEMIC YEAR (2024-2025)

TITLE OF COURSE (Chemical Bases of Biotechnological Drugs: course A-E, F-N and O-Z; Chemical Bases of Biotechnological Drugs)

| Main information about teaching | |
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| Course year | <i>III year</i> |
| Period of disbursement | <i>I I semester</i> |
| University training credits (CFU/ETCS): | <i>7 CFU</i> |
| SSD | <i>CHIM08</i> |
| Delivery language | <i>Italian</i> |
| Frequency mode | <i>compulsory attendance</i> |

| Teacher Channel A-E | |
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| Name and surname | <i>Antonio Scilimati</i> |
| Email address | <i>antonio.scilimati@uniba.it</i> |
| Telephone | <i>080/5442753</i> |
| Site | <i>Department of Pharmacy-Drug Sciences</i> |
| Virtual site | |
| Receipt | <i>Tuesday: 9-11; Wednesday and Friday: 15.30-17.30 (room 446)</i> |
| Teacher Channel F-N, O-Z | |
| Name and surname | <i>Savina Ferorelli</i> |
| E-mail adress | <i>savina.ferorelli@uniba.it</i> |
| Telephone | <i>080/5442748</i> |
| Site | <i>Department of Pharmacy-Drug Sciences</i> |
| Virtual site | |
| Receipt | <i>Tuesday and Thursday 11am (Room 444)</i> |

| Teaching organization | | | |
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| Hours | | | |
| Totals | Frontal teaching | Practice (classroom exercise) | Individual study |
| <i>70</i> | <i>60</i> | <i>10</i> | <i>105</i> |
| CFU/ETCS | | | |
| <i>7</i> | <i>6</i> | <i>1</i> | |

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| Educational objectives | <i>The content of the lessons allows the "Student" to learn the techniques necessary for the study and qualitative-quantitative determination of the interactions between small molecules and biological or synthetic macromolecules, and between bio-macromolecules at the basis of the identification of drug candidates.</i> |
| Prerequisites | <i>For this course, knowledge of General Chemistry and Organic Chemistry is required.</i> |

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| Teaching methods | <i>The main teaching method consists of frontal teaching enriched by theoretical and practical exercises.</i> |
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| <p>Expected learning outcomes</p> <p>Da indicare per ciascun Descrittore di Dublino (DD=</p> <p>DD1 Knowledge and understanding</p> <p>DD2 Applied knowledge and understanding</p> <p>DD3-5 Transversal skills</p> | <p><i>Peculiar aspects regarding the chemical complexity, variability and stability of biotechnological drugs compared with traditional drugs from natural and synthetic sources.</i></p> <p>- Dublin Descriptor 1: knowledge and understanding:</p> <ul style="list-style-type: none"> <i>o Knowledge of isolation and purification techniques of peptides and proteins of pharmaceutical interest.</i> <i>o Knowledge of instrumental techniques for the structural characterization of peptides and proteins of pharmaceutical interest.</i> <i>o Knowledge of the fundamental mechanisms that regulate the interaction between ligands and biomacromolecules and between macromolecules.</i> <i>o Knowledge of instrumental techniques for the qualitative and quantitative determination of interactions between small molecules and biological or synthetic macromolecules, and between bio-macromolecules at the basis of the identification of drug candidates.</i> <p>- Dublin Descriptor 2: Ability to apply knowledge and understanding:</p> <ul style="list-style-type: none"> <i>o Knowledge of methods for obtaining, purifying and identifying peptides and proteins of pharmaceutical interest.</i> <i>o Knowledge of peptides and proteins of pharmaceutical interest</i> <i>o Understanding of the mechanisms of action of peptides/proteins of pharmaceutical interest.</i> <p>- Dublin Descriptor 3: critical and judgment skills: students must have the ability to collect and interpret data (usually in their field of study) deemed useful to determine autonomous judgments, using classroom exercises.</p> <ul style="list-style-type: none"> • Autonomy of judgment <p><i>At the end of the course, the student must be able to</i></p> <ul style="list-style-type: none"> <i>o use the notions learned to evaluate and understand new and more complex aspects of chemical interactions between small molecules and biological or synthetic macromolecules, and between bio-macromolecules at the basis of the identification of drug candidates, also integrating them with information acquired in other courses.</i> <i>o know the applications of some experimental techniques to determine the structure of complex molecules.</i> <p>- Dublin Descriptor 4: ability to communicate what has been learned:</p> <ul style="list-style-type: none"> • Communication skills <p><i>At the end of the course, the student must be able to</i></p> <ul style="list-style-type: none"> <i>o ask questions and provide answers on even complex aspects of the topics studied, in a clear and concise manner, during the course, in subsequent courses, in the relevant doctoral schools, and in the world of work.</i> <p>- Dublin Descriptor 5: ability to continue studying independently throughout life. Students must have developed the learning skills that are necessary for them to undertake further studies with a high degree of autonomy.</p> <ul style="list-style-type: none"> • Ability to learn independently <p><i>At the end of the course, the student must be able to-</i></p> <p>- Dublin Descriptor 4: ability to communicate what has been learned:</p> <ul style="list-style-type: none"> • Communication skills <p><i>At the end of the course, the student must be able to to apply the notions learned to gain new knowledge, through the use of the tools provided: slides presented during the lessons, suggested textbooks and specific bibliography.</i></p> |
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| Teaching Contents (Programme) | <ul style="list-style-type: none"> - Chemical and biotechnological synthesis of peptides/proteins. - Structure of biological macromolecules: receptors, enzymes, cytokines, growth factors, nucleic acids, antibodies. - Chemical-physical stability of biological macromolecules and real time and accelerated stability studies. - Ligand-biological macromolecule interactions: ligand-lipids, ligand-nucleic acids, ligand-carbohydrates, ligand-proteins). - Biomolecule-biomolecule interactions. - Analytical techniques for the structural determination of macromolecules. - Qualitative-quantitative determination techniques of interaction parameters (KD, IC50, ΔG): or qualitative determinations: direct ELISA test, gel filtration, affinity chromatography, co-immunoprecipitation; or quantitative determinations: surface plasmon resonance, fluorescence polarization, competitive ELISA test, calorimetry. - Examples of biotechnological drugs obtained with recombinant DNA technology: human polypeptide hormones (growth hormone, follicle-stimulating hormone, luteinizing hormone and chorionic gonadotropin); cytokines: interleukins, interferons; enzymes with therapeutic properties (deoxyribonuclease, β-glucocerebrosidase, β-galactosidase. |
| Reference texts | <p>Compendium of Pharmaceutical Biotechnology by M. L. Calabrò. Publisher EdiSES Lesson Notes</p> |
| Notes to the reference texts | In-depth articles provided during the lessons |
| Teaching materials | The teaching material provided by the teacher. |

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| Assessment | |
| Learning assessment methods | <p>- The test is oral.</p> <p>Differentiated test methods cannot be provided for attending and non-attending students.</p> |
| Evaluation criteria | <p>During the assessment, the student must demonstrate:</p> <ul style="list-style-type: none"> o • Knowledge and understanding: o o of the topics that make up the teaching program. o • Applied knowledge and understanding: o o in the critical discussion of the topics being assessed. o • Autonomy of judgment: o o In self-assessment of the progress of the assessment. o • Communication skills: o o clarity of presentation. o • Ability to learn: o o verification of the cognitive maturity achieved. |
| Criteria for measuring learning and assigning the final grade | <p>Type of evaluation used: "The final grade is awarded in thirtieths to which honors may be added. The exam is considered passed when the grade is greater than or equal to 18/30.</p> |
| Other | ----- |
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