

## COURSE ID SHEET



Course No. **5300**

**NTUA**

Semester:

**9**

Core

Elective

Specialization

**X**

Title:

**PHARMACEUTICAL CHEMISTRY AND TECHNOLOGY**

Aim:

The aim of the course is to introduce students to the field of pharmaceutical chemistry and technology, drug design of novel bioactive compounds, design and development of drug delivery systems and drug quality control. The course is adapted in the curriculum of Chemical Engineering taking into account that Pharmaceutical Industry constitutes a major field of professional activity for Chemical Engineers. The course is also suggested for students interested in postgraduate studies in the field of pharmaceutical sciences and engineering.

Content:

- Introduction to Pharmaceutical Chemistry and Technology. Drugs. Active pharmaceutical ingredients (API) and excipients.
- Introduction to Pharmacodynamics and Pharmacokinetics. Absorption, Distribution, Metabolism and Excretion of drugs (ADMET properties). Bioavailability and Bioequivalence.
- Classification of drugs according to their pharmacological profile: Non-steroidal anti-inflammatory drugs, analgesics, narcotic drugs, cardiovascular drugs, etc.
- Chemistry of selected representative classes of drugs: Enzymes and enzyme inhibitors. DNA-interacting drugs. Pro-drugs. Chemical synthesis of drugs by multistep procedures. Large- scale synthesis (scale up).
- Introduction to drug design. In silico methodologies. Biomimetic Chromatography. Quantitative Structure- Activity Relationships (QSAR).
- Development of pharmaceutical formulations. Drug delivery systems: tablets, capsules, ointment, cream, suppository, parenteral and transdermal drug delivery systems. Controlled- release drug delivery systems.
- Introduction to the drug quality control: Pharmacopoeias. Identification and quantification of API. Impurities. Uniform distribution of API throughout the pharmaceutical formulation. Sterility Tests. Pyrogen tests. Stability of active pharmaceutical ingredients and excipients. Estimation of shelf-life of pharmaceutical products.

Hours per semester:

|         |           |           |   |            |           |           |            |                         |
|---------|-----------|-----------|---|------------|-----------|-----------|------------|-------------------------|
| LECTURE | <b>24</b> | EXERCISES | - | LABORATORY | <b>16</b> | HOME-WORK | <b>135</b> | <b>TOTAL HOURS: 175</b> |
|---------|-----------|-----------|---|------------|-----------|-----------|------------|-------------------------|

Student performance /evaluation:

The evaluation will be done:

- Through a Final (written) Examination.
- Through the Laboratory Exercises, as it derives from the attendance and conduction of the exercise, the individual laboratory worksheets and the performance in the laboratory test.

**The final grade results as follows:**

**Final Grade = 0.8 x Final Examination + 0.2 x Laboratory Grade**

Laboratory grade will be taken into account only if the student has a grade equal to (5) in the final written examination.