

Subject: **Nanoscopic systems for drug delivery**

Semester: **Spring**

Credits ECTS: **2,5**

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Department / Faculty: **Department of Physiochemistry**
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UB.

Objectives:

The specific knowledge the student will acquire are:

The student would know the designing, physiochemical characterisation and stability of different controlled drug delivery techniques. Tolerance and efficiency analysis techniques. The student should also know the different administration ways and the principal applications in those systems.

The specific competences the student will acquire are:

The student should be able to develop a controlled drug delivery system. Capability of applying the spectroscopical and thermal techniques for colloidal systems characterization.

Capability of planning, developing and spreading scientific works in this field.

Contents:

Topic-1: Controlled systems for releasing drugs. Clasifications. Main administration routes. **(1 hour).**

Topic-2: Development, design and characterization of lipidic systems for controlled drug delivering (Nano and Microemulsions, Liposomes, Lipidic Nanoparticles). **(3,5 hours).**

Topic-3: Development, design and characterization of polymeric systems for controlled drug delivering (Nanoparticles, cyclodextrins). **(4 hours).**

Topic-4: Degradation mechanisms of polymers in "in-vitro" studies of drug delivering from polymeric or lipidic matrix. **(1 hour).**

Topic-5: Stability studies. Analysis of the principal destabilization mechanisms. **(1 hour).**

Topic-6: Therapeutical efficiency studies. Detoxicity and biotolerance analysis of colloidal systems for drug delivering. **(1 hour).**

Topic-7: Drug delivering advances in clinical applications for different administration ways. (Topical and Systemic) **(3 hours)**.

Topic-8: Application of the colloidal systems as no viral vector for gene transference **(1 hours)**.

Topic-9: Application and preparation of vaccines **(1/2 hour)**.

Topic-10: Diagnosis applications: implants and nanodevices. Fluorescent nanoparticales, markers. **(1 hour)**.

Topic-11: Tissue regeneration applications: tissue engineering. **(1 hour)**.

Practical sessions / Lab session:

- 1. Microemulsions: Preparation and characterization (2 hours)**
- 2. Preparation and characterization of different polymeric nanoparticles (Nanocapsules, and Nanospheres) for different techniques. (2 hours)**
- 3. Lipidic nanoparticles: Preparation and characterization (2 hours)**
- 4. Pharmaceutical cession studies "in vitro". Accelerated stability. (2 hours)**

Plan:

Lectures:	18 hours
Laboratory:	8 hours
Independent work:	5 hours
Study:	38 hours

Bibliography

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