PhD Course on ‘Integrated Biomaterials for Medical Devices’

Course Coordinator: Ashutosh Tiwari
“Course in the area of biomaterials and integrated biomedical technology”

Purpose and Scope

The aim of this course is to provide an up-to-date introduction to the fascinating field of integrated biomedical engineering and technology. It covers the latest research and developments in integrated biomaterials: processing, properties, and applications. Included are molecular device materials, biomimetic materials, hybrid-type functionalized polymers-composite materials, molecularly imprinted materials and environmentally friendly materials. Further, all the important aspect dealing with the integrated technology involved in biomedical engineering, especially structure and properties, techniques and technological innovations. This interdisciplinary course is prepared for students and researchers from diverse backgrounds such as chemistry, materials science, physics, pharmacy, medical science, and biomedical engineering. The talks and course materials will give a valuable insight in the major area of biomedical materials, and cutting-edge of medical technology. The interdisciplinary flora of the topics will help PhD students to find new interesting projects/research.

Integrated Biomaterials and Medical Devices (Theory Course): 7,5 ECTS

Duration of Course: 3 months
Course Schedule: April-June 2013
Language of Course: English

Course Contents

Number of lectures: 10, duration of each lecture: 2 hour, 1+1 hour lecture and discussion.

Topic of Lectures

1. Responsive polymers: process, properties and applications
2. Molecularly imprinted polymers and their applications
3. Application of the collagen and chitosan as biomaterials
4. Surface functionalized hydrogels
5. Bionanocomposite matrices: fabrication technology and applications
6. Cell patterning technologies for tissue engineering
7. Integrated nanocarriers for drug delivery, imaging and sensing
8. Nanomaterials toxicity, biocompatibility and environmental health & safety
Course Plan

Number of lectures: 10, (examiner will give lecture 1 and 2, lectures 3-10 will give by the PhD students taking the course, 1+1 hour lecture and discussion); duration of each lecture: 2 hour. Students will be accountable for their lecture materials. Each student should discuss their lecture materials with examiner about 10 days before prior to date of their lecture. The idea is to discuss student lecture materials with the examiner for suggestions and comments before the lecture. The examiner will send lecture materials of the course to each student at the beginning of week. The student will prepare 5-7 set of questions and send to examiner by E-mail along with 5-10 key relevant literature two day before the lecture. Examiner will compiled all questioners & literature and distribute to each course participant one day before the lecture. All questioners & literature will be discussed during discussion hour after the lecture. At end of lectures session, participants will complete a four weeks homework assignment on the course topics (1-8). All participants will discuss homework assignment with the examiner during the final examination.

Estimation of Time (In hour/student)

Lectures: 10 x 2 = 20
Lecture preparation: 35
Preparation of participant lecture: 8 x 10 = 80
Homework assignment and final examination: 68

**Total Time:** 135 hour (study time) + 68 hour (homework assignment and final examination) = 203 hour = 5.1 weeks = 7.6 credits

Total Credits

Total credits of complete course: 7.5
Credits without homework assignment: 5.5

Target Groups

PhD students pursuing degree in the chemistry, materials science, physics, pharmacy, medical science, and biomedical engineering.

Examination and Grading

Grading will be based attendance and active participation in oral seminars.
Text/Reference Books


Contact Person

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