

FACULTY of SCIENCE  
Department of Chemistry

SC/CHEM 4093 3.0 – BIOMATERIALS CHEMISTRY

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COURSE OUTLINE

The course serves as an introduction of materials used in biomedical applications to students with background in chemistry, physics, biology and materials engineering. The course involves formal lectures, twice a week, by the course instructor. The lectures are delivered by writing on the board and supplemented by PowerPoint presentations.

**Prerequisites:** SC/CHEM 3051 3.0 or SC/CHEM 3090 3.0

**Course Instructor:** Valeria Tsoukanova

**Time and Location:** T, TR 11:30 am – 1:00 pm      CB120

**Course Text:** no fixed text; comprehensive notes are provided in the class

**Course Objectives:** The purpose of the course is to introduce students to currently available bioinert and bioactive materials, general aspects of their structure, properties, behavior in contact with biological systems, and selected applications. Students will become familiar with the latest advancements in biomaterials research and technology such as (i) the development of materials with controlled properties and biologically inspired materials that mimic natural systems and processes, (ii) approaches to surface modification for enhanced biocompatibility as well as (iii) the design of sophisticated three-dimensional architectures for tissue engineering.

### **Course Outcomes:**

Students will be able to:

- identify bioinert, bioactive and bioresorbable implantable materials
- apply basic concepts of biomechanics to biomaterial design and characterization
- derive composition–structure–property relationships for implantable materials
- identify major steps in design, development, synthesis and manufacture of biomaterials
- identify strategies for surface modification of implantable materials for enhanced biocompatibility
- predict the in-vivo performance and degradation mechanisms of implantable materials
- describe modern approaches to the design of biomimetic materials and tissue engineering

### **Grading Scheme:**

The grading scheme for the course conforms to the grading system used in undergraduate programs at York. The final grade will be based on in-class written midterm and final assessments. All course assessments will bear a number grade. Midterm assessments are intended to provide 40% of the final grade prior to the course drop deadline.

## **IMPORTANT INFORMATION FOR STUDENTS**

All students are expected to familiarize themselves with University policies, procedures and regulations including

- Senate Policy on Academic Honesty
- Academic Accommodation for Students with Disabilities
- Student Conduct and Responsibilities
- Religious Accommodation

This information is available on the university webpage.