

Class Syllabus MME Program, Spring 2006  
*Spring Quarter*: (10 sessions) Mondays, 6:30-9:50 p.m.,  
March 27-June 5, 2006 (no class May 29, 2006), Bellevue. 4 credits.

## **Biomaterials and Biocompatibility (BioE 599)**

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*(Please always include MME in the subject header for a prompt response)*

Class web-site address:

<http://www.uweb.engr.washington.edu/education/Bioe599/index.html>

ID: **biomaterials**

Password: **rfun**

University of Washington Engineering Biomaterials (UWEB)

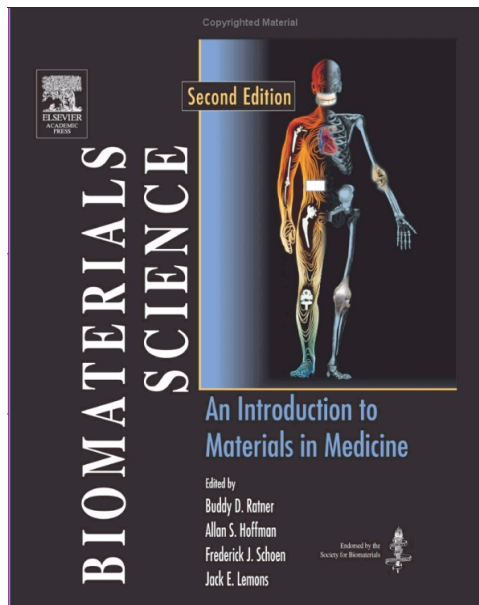
<http://www.uweb.engr.washington.edu/index.html>

This course is designed to give graduate students an acquaintance with the growing and complex field of biomaterials and biocompatibility. The material covered will familiarize the students with the range of commonly used biomaterials and the criteria for biocompatibility.

Biomaterials are widely used in medical devices and in biotechnology. This course covers the materials science and the biology basics needed by an engineer to appreciate the use of materials in medicine and biology. Subjects addressed include an overview of applications, biocompatibility, biomaterials types and properties, biomolecular materials, protein adsorption, cells on biomaterials, diagnostics, smart materials, drug release, tissue engineering, biomechanics of medical devices, blood compatibility and biosurfaces. The course is team-taught by bioengineering and medical school faculty.

The text is **Biomaterials Science, Second Edition : An Introduction to Materials in Medicine (Hardcover)**

by Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen, Jack E. Lemons  
This book is available for purchase at the Bellevue location of the University Bookstore.



Lecture notes by each lecturer will be available in PDF format on a class dedicated WWW site.

This year that site is the following:

<http://www.uweb.engr.washington.edu/education/Bioe599/index.html>

Login name and password are "**biomaterials**" and "**rfun**", respectively, all lowercase.

Do NOT distribute the passwords or lecture notes to anyone not in the class!

The most current lecture notes will be posted the day of the lecture during the course.

It is suggested that you BRING A COPY of the relevant PDF file to class (electronically on a laptop or printed on paper) to simplify notetaking.

#### Student Expectations and Participation:

The following is expected of students in "Biomaterials and Biocompatibility":

I. You should endeavor to participate in the discussion sections of all lectures. Participation in discussion enriches the educational experience for all.

II. Homework or research paper assigned by each week's lecturer must be complete in one week. These assignments are to be delivered by e-mail to the TA for the course, Floyd Karp ([floyd@u.washington.edu](mailto:floyd@u.washington.edu)), and cc'd to the

professor, by 5 PM of the date shown in the calendar below. Please title the assignment: Lastnamefirstname weekX.doc, where X is the number of that week's lecture.

Discussion among students preparing these homeworks is acceptable, but the actual writing of each homework must be in the student's own words. Please list the names of any student(s) collaborating with you on a problem or assignment under "references". Overdue assignments (without prior approval or a really exceptional excuse) will be graded down 50%.

Writing must be in acceptable technical English, with attention paid to punctuation, grammar, etc. Include a formal but brief list of references at the end (2-5 references would be adequate), if appropriate. Referencing only www sites alone is not satisfactory, because they do not constitute peer-reviewed material. Any form of plagiarism (see class web-site) will be rewarded by a grade of 0 on that piece of work and all subsequent work for the class. We take this very seriously. The weighting for grading will be the following:

To prevent overburdening the students (and the faculty) in the class, grading will be based on the best 7 write-ups of weekly assignments. The low scores will be dropped, and the grades from the 7 top scores will be added. It is possible to get a 4.0 after only submitting 7 assignments, but the rational student will submit as many as possible to increase the odds. We will attempt to get the all write-ups back in a timely manner to allow students to assess how their writing is viewed by the professor and TA.

III. There will be a take-home final The exam will be handed out at the conclusion of the class **May 22nd** shown in the calendar below, and is due two weeks later, at the beginning of the last lecture on **June 5th**, also as shown in the calendar below. It also is to be delivered hard-copy in-person. It is due at 6:30 PM on **June 5th**. Discussion or collaboration among students is not permitted for the final exam.

Grading:

In Class Participation: bonus  
Written Assignemtns: 7 x (8 points) 56 points  
Final Examination: 44 points  
TOTAL 100 points

Syllabus

March 27 -- Introduction to Biomaterials (B. Ratner)

April 3 -- Biomaterials (types and properties) (A. Hoffman)

April 10 – Blood Compatibility and Vascular Prostheses (B. Ratner)

April 17 -- Proteins at Interfaces (T. Horbett)

April 24 -- Cells and Surfaces (C. Giachelli)

May 1 -- Molecular Materials (P. Stayton)

May 8 -- Controlled Release and Biomaterials (A. Hoffman)

May 15 - Tissue Engineering (B. Ratner)

May 22 – Biomechanics and Orthopedic Implants (R. Ching) -- **Take-home final exam**

May 29 – no class

June 5 – BioSurfaces: Surface Modification & Analysis (D. Castner) -- **Final exam due 6:30pm**

The course meets Mondays, 6:30-9:50 p.m., Bellevue Educational Outreach Facility.

Coordinator, Lecturer and Professor of Record:

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