BMEN 3321: Biomaterials (Spring 2020)

Instructor:
Dr. Xiaodan Shi Xiaodan.Shi@unt.edu
Office: K240 J
Office hours: M-Th 2:00-3:00 pm, or by appointment

Class Schedule:
BMEN 3321
T and Th: 4:00-5:20 pm, Discover Park K120

Course Description
This course is designed to provide a comprehensive introduction to the world of biomaterials, linking fundamental properties of synthetic and natural materials to biological systems and biomedical applications. Emphasis is placed on using biomaterials for hard and soft tissue replacement.

Learning Objectives
Students are expected to (1) understand fundamental knowledge of biomaterials including metals, polymers, ceramics, and natural materials; (2) be familiar with biomaterial requirements for certain biomedical applications; (3) be able to apply principles for designing biomaterials in a given application.

Brief list of topics to be covered:
- Definition, history, and impact of biomaterials
- General properties of materials
- Metals, ceramics, and polymers
- Natural materials
- Biocompatibility and host response
- Tissue engineering
- Implants and devices

Textbooks and Other Course Materials
No required textbooks. The covered content is adapted from the following textbooks and current literatures. Lecture notes will be posted on Canvas (course files).

- Introduction to Biomaterials – Basic Theory with Engineering Applications, by C. Mauli Agrawal, et al. (Cambridge University Press, 2014)

Major Assignments and Grading

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<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
<th>Grade Range</th>
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<tbody>
<tr>
<td>Participation/Quizzes</td>
<td>10%</td>
<td>A 89.5 – 100 %</td>
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<tr>
<td>Homework</td>
<td>20%</td>
<td>B 79.5 – 89.4 %</td>
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<tr>
<td>Two Exams</td>
<td>60%</td>
<td>C 69.5 – 79.4 %</td>
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<tr>
<td>Final Project</td>
<td>15%</td>
<td>D 59.5 – 69.4 %</td>
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<td>F &lt;59.4%</td>
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Homework

- Homework is due on the designated time in class unless otherwise stated. The lowest homework grade will be dropped off.
- Late policy: same day after 6 pm – 80%; next day – 50%; third day late – 0%.

Exam

- Two closed book/notes exams will be given during the semester. Each exam will be sectional and cover the lecture notes, homework questions, and assigned reading materials. There will be no final exam.
- Exam questions will be a combination of true/false, fill in the blanks, matching, multi choices, short answers, etc.
- Exam 1: 3/5 4:00-5:20 pm
  Exam 2: 4/23 4:00-5:20 pm

Final Project

1. Students will work in groups of 4 or 5, unless otherwise assigned.
2. Each group will give a 10(+3) min presentation (10%) to the class at the end of the semester. All group members must present and participate during the presentation. Any group member that is not present for their group presentation will receive a zero for the entire final project grade.
3. Topics of the presentation should be selected from any closely course-related original research (non-review/opinion) journal publications within 5 years (2015-2019). More details will be posted on Canvas later. https://www.ncbi.nlm.nih.gov/pubmed/
4. Each group member will also prepare an individual one-page summary (5%) of the selected publication (journal abstract style). Template will be posted on Canvas later.
   - Turnitin will be applied for similarity check. Similarity report more than 20% will be considered Plagiarism and will not be accepted, resulting in a zero grade.
   - You may always check the similarity report once submitted to Canvas, revise and resubmit before due time, accordingly. The last submitted version before due time will be graded only. Submission after due time will not be graded.

Due dates:

- 2/25: Submit group member names to Canvas.
- 3/17: Submit your choice of presentation topic to Canvas for approval. If not approved, you have two days to resubmit another topic.
- 4/14: Submit the draft of your presentation slides to Canvas. Select your presentation date and time on Canvas.
- 4/28-4/30: Group presentations will be at the regular meeting place and time.
- 5/5: Submit your one-page publication summary to Canvas.
Registration, Drop and Withdrawal Policy

Drop: It is the student’s responsibility, and not the instructor’s, to drop the course. You may find important details about how dropping a class can affect your GPA and your Financial Aid here: http://registrar.unt.edu/registration/dropping-class

Withdrawal: It is the student’s responsibility to withdraw from the course by either going to their academic advisor’s office (which should be the first stop when considering a withdraw), the Registrar’s office, or the Department. If you can’t complete the course, you must withdraw for a “W” (after this date, you’d receive either a “WP” or a “WF”). Withdrawing from a course is a formal procedure which YOU must initiate. I can’t do it for you. If you simply stop attending and do not withdraw, you will receive a performance grade, usually an “F.” All deadlines can be found at: http://registrar.unt.edu/registration/fall-registration-guide

University Policy on Academic Misconduct

Academic Misconduct (Sec. 3.4 from the Student Handbook):
Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life. Specific examples include, but are not limited to:

Cheating: Copying from another student’s test paper, written assignment, other report, or computer files and listings; Using, during any academic exercise, material and/or devices not authorized by the person in charge of the test; Collaborating with or seeking aid from another student during a test or laboratory without permission; Knowingly using, buying, selling, stealing, transporting, or soliciting in its entirety or in part, the contents of a test or other assignment unauthorized for release; Substituting for another student or permitting another student to substitute for oneself.

Plagiarism: The appropriation, theft, purchase or obtaining by any means another’s work, and the unacknowledged submission or incorporation of that work as one’s own offered for credit. Appropriation includes the quoting or paraphrasing of another’s work without giving credit therefore. THIS ESPECIALLY APPLIES TO ONLINE RESOURCES! Turnitin will be utilized to ensure online resources are not misappropriated.

Any work not meeting this standard will be evaluated and subject to either a re-write, if the Instructor concludes that the assignment was unintentionally plagiarized or a zero for the assignment. Egregious forms of academic conduct are subject to a formal hearing. For information on the University’s policies regarding academic integrity and dishonesty, see the UNT Center for Student Rights and Responsibilities, http://www.unt.edu/csrr/.

Collusion: The unauthorized collaboration with another in preparing work offered for credit.

Sexual Discrimination, Harassment and Assault

UNT is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these acts of aggression, please know that you are not alone. The federal Title IX law makes it clear that violence and harassment based on sex and
gender are Civil Rights offenses. UNT has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more.

**Personal Distress**

Excerpts from [http://studentaffairs.unt.edu/care](http://studentaffairs.unt.edu/care) “The University of North Texas cares about our students' success, not only academically, but emotionally and physically.... Because of our commitment, we provide literally hundreds of departments and services across campus that respond to our students' unique needs.... UNT believes it is important to foster an environment that encourages students to maintain a standard of responsibility for self-care which includes the ability to respond adequately to one's emotional, physical, and educational needs. If you are experiencing physical or emotional distress which adversely affects your ability to succeed in class, please see me as soon as possible. Together, we will point you towards the appropriate resources.