

**CHEM 5319 / 6319**  
**Contemporary Topics in Analytical Chemistry**  
(Bioanalysis & Microfluidic Lab-on-a-Chip, Spring 2019)  
10:30 - 11:50 AM TR  
Location: TBA

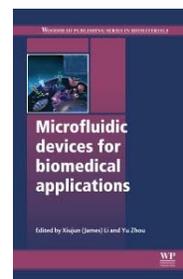


**Instructor:** XiuJun James Li, Ph.D.

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**References:**

- **Li, XiuJun, Yu Zhou**, Editor "***Microfluidic Devices for Biomedical Applications***", Woodhead Publishing (a part of Elsevier), 2013, 684 Pages. ( ISBN 0 85709 697 4; ISBN-13: 978 0 85709 697 5). Check [Elsevier Store](#) and Amazon for more detailed information.



**Brief Course Description:**

- This course will present multidisciplinary techniques for contemporary **bioanalytical chemistry** and **biomedical engineering**, with an emphasis on microfluidic lab-on-a-chip. While focusing on microfluidic lab-on-a-chip, it will also cover other topics related to bioanalysis, such as microfabrication, nanotechnology, separation science, capillary electrophoresis, various detection methods (e.g. laser-induced fluorescence), immunoassay, and different biological applications (e.g. single-cell analysis and genetic assays). From this course, the student will learn the fundamentals of microfluidics and its applications in chemistry, life science, and bioengineering.
- This course may use iClicker Reef App for in-class polling, quizzes, and so on. Please download it to your mobile devices ahead of time.

**Objectives:**

- To learn recent techniques in modern analytical chemistry: microfluidic lab-on-a-chip and nanotechnology.
- To develop research abilities to propose new solutions to solve problems using modern analytical chemistry techniques.
- To develop interdisciplinary research abilities.
- To become conversant with recent research advances in bioanalytical chemistry.

**Contents:**

- Introduction of microfluidics
- Fundamentals of microfluidics:
  - Device microfabrication

- On Silicon, glass, polymer, and paper substrates
- Separation Science
  - Fundamentals
  - Capillary Electrophoresis (CE) separation
  - Microchip CE separation
  - Detectors
- Microfluidic system setup
- Applications:
  - Cellular analysis (single-cell analysis)
    - 3D cell culture and tissue engineering
  - Nucleic Acid analysis
  - Protein analysis
  - Low-cost medical diagnosis
  - Other applications
- Nanosensing and applications

*Some lab/core facility tour will be arranged, if time and conditions permit.*

**Evaluations:**

Exams: 50% (in-class quizzes, midterm, and the final exam)

Presentation: 20 %

Research paper: 25 %

Attendance: 5%

Class Participation Bonus: 5 %

**Grades:**

A: 89% - 100%, B: 79% - 89%, C: 70%-79%, D: 60%-69%, F: <60%

**Important Dates:**

- Midterm: 03/26/2019
- Final Exam: 05/09/2019

**Absence:**

Doctor note can be accepted for the absence of class to avoid absence penalty. But any missing exams, quizzes, and other in-class tests will not be arranged for the student to make up.

**Academic honesty:**

Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Violations will be taken seriously

and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

### **Students with Disabilities**

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of disabled Student Services located in Union E Room 203. Students who have been designated as disabled must reactivate their standing with the Office of Disabled Student Services on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Services. You may call 747-5148 for general information about the Americans with Disabilities Act (ADA).

All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, departmental chair, and the dean. Although UTEP will allow a maximum of one year to complete this contract, the College of Science requests it be limited to one month based upon completion data. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.

*Syllabus is subject to change. Any change will be announced in class, or by email, or posted on the Blackboard site during the semester. You are solely responsible for getting the most updated information.*