Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. This request is submitted by the Department of Electrical & Computer Engineering

2. Course prefix, number and complete title of course: ECEN 694 Nanobiotechnology

3. Course description (not to exceed 50 words): Introduction to advances in nanobiotechnology; includes fabrication of micro or nano structures, molecular manipulation, medical diagnostic and treatment options, nano scale machines such as molecular motors for drug delivery.

4. Prerequisite(s): Graduate standing; approval of instructor

5. Is this a variable credit course? □ Yes □ No If yes, from _______ to _______

6. Is this a repeatable course? □ Yes □ No If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? □ Yes □ No

7. Has this course been taught as a 489/689? □ Yes □ No If yes, how many times? 2

Indicate the number of students enrolled for each academic period it was taught. Spring '07 - 8, Spring '08 - 18.

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   M.S., MENG, Ph.D. in Electrical & Computer Engineering

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix Course # Title (excluding punctuation)

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<th>694</th>
<th>NANO</th>
<th>BIO</th>
<th>TEC</th>
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Approval recommended by:

Head of Department Date

Head of Department (if cross-listed course) Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services Date

Questions regarding this form should be directed to Sandra Williams at 845-8201.
Curricular Services – 11/07
ECEN 694-Nanobiotechnology

Instructor:  Dr. J. Kameoka
Office:  312E Zachry
Phone:  (979)845-7564
Email:  kameoka@ece.tamu.edu

Prerequisite:  Graduate standing; approval of instructor

Description:  Introduction to advances in nanobiotechnology; includes fabrication of micro or nano structures, molecular manipulation, medical diagnostic and treatment options, nano scale machines such as molecular motors for drug delivery.

Learning Outcomes:  This lecture contains the basic biology which is the vital for understanding the nano-bio devices. Thus, the first outcome is “understanding basic biology”. The second outcome will be the understanding the cutting edge technology of nanobiotechnology. This lecture include many examples of current research for nanobiotechnology. With the knowledge of basic biology, student can understand how they works and what purpose these devices are made.

Grading Policy:
Midterm exam (30%),
Homework (20%): 5 times bi-weekly,
Research paper project (10%)
Final take home exam (40%)

Grading system
8 Homework problems  80 points
1 preliminary examination  120 points
1 final examination  120 points
1 final project  80 points
Total  400 points
340-400 points  A
300-340 points  B
260-300 points  C
220-260 points  D
Lower than 220  F

Topics to be covered:
(1) Introduction (2 hours).
   - Nanotechnology and Biology
(2) Basic Biochemistry I (6 hours)
   - Cell mechanism.
   - Energy and molecules for cell
(3) Molecular motor (8 hours)
• Physical principles
• Cytoskeleton and motor protein

(4) **Basic biochemistry II (6 hours)**
- Biomolecules
- Genetics

(5) **Nanofluidics: (5 hours)**
- Entropic interaction of molecules with nanostructures.
- Electrophoresis and molecular separation science.
- Molecular manipulation in nanoscale fluidics.

(6) **Basic Biochemistry III: (6 hours)**
- Genetic engineering
- Disease related biology

(7) **Nanophotonics: (6 hours)**
- Evanescent wave field
- Surface plasmon resonance

(8) **Nanomechanical sensor: (3 hours)**
- Cantilever sensor
- Mechanical resonance theory

**Americans with Disabilities Act (ADA) Policy Statement:**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637.

**An Aggie does not lie, cheat, or steal or tolerate those who do.**
Honor Council Rules and Procedures: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)