Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional

Submit original form and 25 copies. Attach a course syllabus to each.*

1. This request is submitted by the Department of Mechanical Engineering

2. Course prefix, number and complete title MEEN 610 Applied Polymer Science

3. Course description (not more than 50 words) Macromolecular concepts, molecular weight, tacticity, theory of solutions, rubber elasticity, thermal transitions, rheology, crystallinity, heterogeneous systems and relation of mechanical and physical characteristics to chemical structure; applications to polymer blends, thermosetting resins, structural adhesives and composites; design and processing of fibrous composites.

4. Prerequisite(s) Graduate Classification

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 the course be repeated within the same semester/term? □ Yes □ No

7. Has this course been taught as a 489/689? □ Yes □ No If yes, how many times? ______ Indicate the number of students enrolled for each academic period in year(s) 2008

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in history)

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 (exclude punctuation) MEEN 610 APPLIED POLYMER SCIENCE
       Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
       0 3 0 0 0 3 1 4 1 9 0 1 0 0 6 1 9 2 0 8 0 9 0 1 0 3 6 6
       Level

Approval recommended by:
Head of Department
Date

Head of Department (if cross-listed course)
Date

Submitted to Coordinating Board by:
Dean of College
Date

Director of Academic Support Services
Date

Effective Date

* Attach a syllabus according to the guidelines on the Internet site www.tamu.edu/admissions/oaras. To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
SYLLABUS: Engineering with Plastics/Applied Polymer Science

MEEN 610

<table>
<thead>
<tr>
<th>Location</th>
<th>Day/Time</th>
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<tbody>
<tr>
<td>ENPh 205</td>
<td>Tuesday/Thursday</td>
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<td>9:35 a.m. – 10:50 a.m.</td>
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**Instructor:** Roger J. Morgan  
**Office:** ENPH 216  
**Phone:** 979-845-1292  
**Email:** rjmorgan@tamu.edu  
**Office Hours:** Monday and Wednesday 10:00 a.m. – Noon
MEEN 610 Engineering with Plastics/ Applied Polymer Science

COURSE DESCRIPTION: Polymer structure, processing, property characterization at the molecular, microscopic and macroscopic dimensional levels for thermosets, thermoplastics, elastomers, fibers, and advanced fibrous nanoparticle filled composites and smart multi-performance structures.


COORDINATOR: Dr. Roger J. Morgan, Professor, Department of Mechanical Engineering Room 216, Engineering/Physics Building (ENPH), Office Wing (979) 845-1292, rimorgan@tamu.edu

COURSE OBJECTIVES: To provide students with an overview of polymer mechanical properties as they pertain to design and material characterization.

PREREQUISITES: ENGR 213

TOPICS: Course Description, Logistics/Background, and Polymer Types
- Polymerization
- Chemical Structure/Molecular Characterization
- Physical Structure/Thermal Properties
- Processing-Structural Forms
- Mechanical Properties/Deformation-Failure Mechanisms
- Service Environment Degradation Mechanisms
- Thermosets/Elastomers
- MID-TERM EXAM/ Term Papers Plans
- Thermoplastics
- Fibers/Carbon/Kevlar
- Composites
- Advanced Material Concepts
- Whole Life Cycle/Materials Selection Procedures
- Test Procedures For Advanced Materials
- Nanotechnology
- FINAL EXAM
MEEN 610
Team Projects

AEROSPACE MATERIALS
   • AIR FORCE
      (1) Joint Strike Fighter
      (2) Electron Beam Processing of Composites
      (3) Fast Cooling Surfaces for Stealth Aircraft
      (4) Smart Biometric Multiperformance Structures
      (5) Hypersonic Vehicles; Attack-Missile Defense
      (6) Ultra High Temperature Polymers
      (7) Light Weight Thermal Protection
   • NASA
      (8) Future Space Vehicles
      (9) Shuttle, Space Station Safety
      (10) Space Travel

AUTOMOTIVE MATERIALS
   (11) Economic Carbon Fibers
   (12) Composites Versus Aluminum and Steel
   (13) Fuel Cells

CIVIL INFRASTRUCTURE MATERIALS
   (14) Composites and Coatings
   (15) 75 Year Durability (2)

OIL DRILLING MATERIALS
   (16) Pipes, Coatings, Drill Bits
   (17) Platforms, Tethers

HOMELAND SECURITY
   (18) Blast Proof Transparencies
   (19) Soft Body Armor
   (20) Ceramic Body Armor

BIOMATERIALS
   (21) Prosthetics
   (22) Dental
   (23) Mad Cow Disease
   (24) Virus Structure-Performance (Avian Flu)
   (25) Cancer Propagation, Materials Prevention

NANOTECHNOLOGY
   (26) The Hype—What is Feasible and Why

FUTURE ENERGY SOURCES
   (6) Oil Shale, Sand? the Potentials
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 the Department of Student Life, Services for Students with Disabilities, in Room B118 of Cain Hall or call 845-1637.

Academic Integrity Statement

"An Aggie does not lie, cheat, or steal or tolerate those who do."

"The Aggie Code of Honor is an effort to unify the aims of all Texas A&M men and women toward a high code of ethics and personal dignity. For most, living under this code will be no problem, as it asks nothing of a person that is beyond reason. It only calls for honesty and integrity, characteristics that Aggies have always exemplified. The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other."

http://student-rules.tamu.edu/aggiecode.htm