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

Form Instructions
1. Course request type: □ Undergraduate  ◐ Graduate  □ Professional (e.g., JD, MD, etc.)
2. Request submitted by (Department or Program Name): Biomedical Engineering
3. Course prefix, number and complete title of course: BMEN 606 - MEDICAL DEVICE PATH TO MARKET
4. Catalog course description (not to exceed 50 words): Because the medical device industry operates within a highly regulated, global environment, this course focuses on the path to market for a medical device with specific attention to the regulatory affairs so to enable the development of an appropriate regulatory strategy.

5. Prerequisite(s): Graduate classification or approval of instructor
Cross-listed with: ____________________________
Stacked with: BMEN 406
Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes  ◐ No  If yes, from _____ to _____
7. 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

8. Will this course be submitted to the Core Curriculum Council? □ Yes  ◐ No
9. 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., M.Eng., Ph.D. in Biomedical Engineering

10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
11. I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls-export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)
   BMEN  606  MED DEVICE PATH TO MRKT

   Lect.  Lab  SCI  CHP and Fund Code  Admin. Unit  Acad. Year  FTE Code
   0  3  0  0  0  3  1  4  0  5  0  0  1  0  0  0  6  0  4  5  0  1  5  -  1  6  0  0  3  6  3  2

Approval recommended by:
Gerard L. Coté
Department Head or Program Chair (Type Name & Sign)  7/15/14
Chair, College Review Committee  8/4/14

Department Head or Program Chair (Type Name & Sign)  Date
(if cross-listed course)  Dean of College  Date

Submitted to Coordinating Board by:
Associate Director, Curricular Services  Date  Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 04/14
Course number and title: BMEN 606 Medical Device Path to Market
Term: TBA
Meeting times and location: TBA, TBA

Course Description
The medical device industry operates within a highly regulated, global environment. This course is focused on the path to market for a medical device with specific attention to the regulatory affairs so to enable the development of an appropriate regulatory strategy.

Prerequisites: Graduate classification or permission of instructor

Course Objectives

1. Students will be able to use the fundamental elements and development of an effective regulatory strategy for commercialization of a medical device invention.

2. Students will be able to identify and describe the basic test method designs which are acceptable to the regulatory bodies of US, Canada, and Europe.

3. Students will be able to list the basic requirements for initiating a human clinical trial in the US and OUS markets.

4. Students will be able to identify, classify, and describe the basic regulations and associated requirements and enforcements for market approval in the US and OUS markets.

5. Students will be able to list the current post-market activities required by FDA (US markets).

Instructor Information

Name: Maurice A. Brewer
Email address: abrewer@bme.tamu.edu
Office hours: TBA and as arranged via email
Office location: TBA
Required Text: None
Class Topics and Dates

Subject to change, however, topics of each week are expected to be as follows:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview: Introduction to Regulatory Affairs, Regulatory Law, and Associated Regulatory Bodies</td>
</tr>
<tr>
<td>2-4</td>
<td>Module 1 Regulatory Strategy</td>
</tr>
<tr>
<td>5-6</td>
<td>Module 2 Design and Manufacture: Invention, Proof-of-concept testing, Design, and Manufacture</td>
</tr>
<tr>
<td>7-8</td>
<td>Module 3 Preclinical Testing: Pre-GLP and GLP studies in laboratory animals</td>
</tr>
<tr>
<td>9-10</td>
<td>Module 4 Clinical Strategies and Trials: Clinical trial plans, IDEs, IRBs, and GCP</td>
</tr>
<tr>
<td>11-13</td>
<td>Module 5 Commercial Approval: PMA requirements, CE Mark requirements, Advertising and Promotion</td>
</tr>
<tr>
<td>14-15</td>
<td>Module 6 Post Market Activities: Medical device reporting, register, and post-market studies</td>
</tr>
</tbody>
</table>

Grading Policies:
Work missed due to absences will only be excused for University-approved activities in accordance with Texas A&M University Student Rules (http://student-rules.tamu.edu/). Specific arrangements for make-up work in such instances will be handled on a case-by-case basis.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 to 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 to 89%</td>
</tr>
<tr>
<td>C</td>
<td>70 to 79%</td>
</tr>
<tr>
<td>D</td>
<td>60 to 69%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>

Americans with Disabilities Act (ADA)

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. For additional information visit http://disability.tamu.edu.

Academic Integrity

"An Aggie does not lie, cheat or steal, or tolerate those who do." For more information on Honor Council Rules and Procedures, go to: http://aggiehonor.tamu.edu/
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
• Submit original form and attach a course syllabus. •

Form Instructions

1. Course request type:  
   - [ ] Undergraduate  
   - [X] Graduate  
   - [ ] First Professional (DDS, MD, JD, PharmD, DVM)

2. Request submitted by (Department or Program Name):  
   Department of Maritime Administration

3. Course prefix, number and complete title of course:  
   MARA 673: International Maritime Industry Graduate Management Experience

4. Catalog course description (not to exceed 50 words):  
   Combines classroom and graduate research work with international travel and provides the student direct contact with maritime industry managers. The trip emphasizes cultural and historical aspects of the maritime industry outside of the United States providing a better understanding of differing management styles, business practices and regulatory focus.

5. Prerequisite(s):  
   Graduate status
   Cross-listed with:  
   Stacked with:  
   MARA 493

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   - [X] Yes  
   - [ ] No
   If yes, from ___1___ to ___4___

7. Is this a repeatable course?  
   - [X] Yes  
   - [ ] No
   If yes, this course may be taken ___2___ times.

   Will this course be repeated within the same semester?  
   - [ ] Yes
   - [X] No

8. Will this course be submitted to the Core Curriculum Council?  
   - [ ] Yes  
   - [X] No

9. How will this course be graded?  
   - [X] Grade  
   - [ ] S/U
   - [ ] P/F (CLMD)

10. This course will be:  
    a. required for students enrolled in the following degree programs (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)

   Master of Maritime Administration and Logistics

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

12. [X] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

13. Prefix  
    Course #  
    Title (excluding punctuation)  
    INTL MARITIME MGMT GRAD EXP

    | Lect. | Lab  | Other | SCH | COP and Fund Code | Admin. Unit | Acad. Year | EICE Code | Level |
    |-------|------|-------|-----|--------------------|-------------|------------|-----------|-------|
    | 4.00  | 0.00 | 0.00  | 4.00| 5211010016         | 1814        | 15         | 16        | 0     |

   Approval recommended by:  
   [Signature] 9/24/14  
   Department Head or Program Chair (Type Name & Sign)  
   Date

   Chair, College Review Committee  9/24/14
   Date

   Dean of College  9/24/14
   Date

   Chair, Co. of CURS  9/24/14
   Date

   Associate Director, Curricular Services  
   Date  
   Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 07/14
Texas A & M University at Galveston  
Course Syllabus  
MARA 673– International Maritime Industry Management Experience  
Maymester, 2015  
Department of Maritime Administration

INSTRUCTOR  
Joan P. Mileski, Ph.D.

MEETING TIMES AND PLACE  
London, England UK  

LEAD INSTRUCTOR INFORMATION

E-mail: mileskij@tamug.edu  
Office Phone: 409-740-4978  
Office Location: CLB 229  
Office Hours: Tuesdays and Thursdays from 1:00pm to 1:50 pm and Mondays, Wednesdays, Fridays by appointment. I am typically in my office more than the listed hours. As such, I often have multiple distractions and perform several different functions. Therefore, if you need extended time or a personal/private conference, please make an appointment so I can commit the amount of time needed.  
Web information: We use eCampus for all notes and facebook for all information  
Contacting students: The department will use your on-campus Email address as the primary means of contacting you. Please check your email daily.

TEXTBOOK  
Course Text: Articles as assigned by instructors prior to departure  
Supplementary Text: None  
Other Required Materials: None

COURSE DESCRIPTION  
This course combines classroom work with international travel and provides the student direct contact with industry managers and regulators in the international maritime industry. The two week long international trip emphasizes cultural and historical aspects of the maritime industry outside of the United States providing a better understanding of differing management styles, business practices and regulatory focus. (ICD credit)

COURSE SEQUENCE IN CURRICULUM  
This course is an elective course for the Maritime Administration major.
COURSE OBJECTIVES
This is a high impact course in the regulatory and business environment of the international maritime industry. London is the home of the International Maritime Organization (IMO) which regulates the global industry. Further, London is one of the world capitals on maritime commerce with business organizations in ship design, building, ownership, insurance and finance. Further, many maritime NGOs are also headquartered there.

LEARNING OBJECTIVES:

This course has five broad objectives (for a course in UK). The student will be able to……...

First, fully explain the maritime business industry cluster in the EU and in particular the UK.

Second, compare and contrast maritime business in the U.S. with maritime business in the EU/UK.

Third, demonstrate knowledge of the culture and history of the maritime law and business in the UK and its influence on U.S. maritime operations.

Fourth, describe the importance of the UK in development of maritime industry regulation.

Fifth, evaluate issues facing the organization and strategies employed by UK maritime organizations through face-to-face questioning of top management.

TOPOICAL OUTLINE
Session/Date Tentative Schedule (Schedule is subject to change due to unforeseen circumstances)

April 20 Review syllabus, discuss course expectations, discuss safety and behavior expectations.

May 16 Depart for London from Houston Terminal E 8:50 pm

May 17 Arrive in London Heathrow, Terminal 4 12:05 pm
Queen’s Park Hotel
48 Queensborough Terrace
London
W2 3SJ
http://www.queensparkhotel.com
Rest of day free

May 18 Business attire
Baltic Exchange with Bill Lines at 10 am
38 St Mary Axe, London EC3A 8BH, United Kingdom
+44 20 8858 4422

Shell Trading and Transportation with David Cudbertson at 13:30
80 Strand London WC2R 0ZA United Kingdom

May 19 Business casual attire
Greenwich at 10:00 am

Maritime Museum
Park Row, Greenwich, London SE10 9NF, United Kingdom
44 20 8858 4422

Royal Observatory
Blackheath Ave, London SE10 8XJ, United Kingdom
+44 20 8858 4422

Cutty Sark
King William Walk, London SE10 9HT, United Kingdom
+44 20 8858 4422

Aaron Bigbee at 4:30 pm in Mayfair

May 20

Business Casual
International Transportation Workers Federation (ITF) at 14:00
With Steve Trowsdale
49-60 Borough Rd, London SE1 1DR
44 (0) 20 7403 2733

May 21

Business attire
Lloyds Register with Barbara Jones at 9:30 am
71st Fenchurch Streen, London Ec3M 4BS, UK
+44(0)20 7423 2077

International Maritime Organization (IMO) with Berty Nayna at 2:00pm
4 Albert Embankment, Lambeth, London SE1 7SR, United Kingdom
+44 20 74634003

May 22

Business Casual attire
Chartered boat tour of working Port of London with Martin Garside at 1045
61 Trinity Buoy Wharf London E14 0FP
(44) 20 7001 2211
*Lunch Provided*

May 23

Casual attire
Tower of London at 10:00
London EC3N 4AB, United Kingdom
+44 844 482 7777

May 24

open

May 25

Business attire
Lloyds of London with Peter Fletcher at 10:30 am
1 Lime St, London EC3M 7HA, United Kingdom
44 (0)20 7327 1000

Churchill War Rooms at 14:30
Clive Steps, King Charles St, London SW1A 2AQ, United Kingdom
+44 20 7930 6961

May 26

Business casual attire
Portsmouth dockyards
Victory Gate, HM Naval Base, Portsmouth PO1 3LJ, United Kingdom
+44 23 9283 9766

Winchester Cathedral
9 The Close, Winchester, Hampshire SO23 9LS, United Kingdom
+44 1962 857200

May 27
Business casual attire
Royal Courts of Justice with Pat Rowe at 11:00 am
Strand, London WC2A 2LL, United Kingdom
+44 20 7947 6000
Victoria Palace Theatre “Billy Elliot” at 1930
Victoria St, London SW1E 5EA, United Kingdom
+44 20 7492 9968

May 28
Business attire
Clarksons with Trevor Crowe at 11:00 am
St. Magnus House 3 Lower Thames Street London United Kingdom EC3RA 6HE
(44) (0)20 7334 0000
Morgan Stanley with Tom Hewitson at 15:00
25 Cabot Square, Canary Wharf, London E14 4QA, United Kingdom
+44 20 7425 8000

May 29
Business casual attire
House of Parliament at 9:20 am
Palace of Westminster London SW1A 2PW, United Kingdom
44 20 7291 9825
Westminster Cathedral at 2:00 pm
42 Francis St, London SW1P 1QW, United Kingdom
+44 20 7798 9055

May 30
Depart London 11:40 am Heathrow Terminal 4 and return to Houston 4:25 pm
Terminal E

For further in-progress trips, see attachment at end of syllabus

Teaching Strategies
This is an activities-driven. Students must be prepared to discuss and question presenters and other representative of the organization we visit. Our philosophy for the learning environment is the role of the professor as director of learning among equals. The relationship is a partnership where each, professor and student, are fully prepared for and enthusiastically embrace, each and every learning experience. We believe that insight (truth) can be an exciting experience for faculty and students alike. We try to instill in students that they must be their own lifetime teachers continuously gathering and discarding the appropriate skill sets for life long learning, success, and service to society.

Assessment of Learning:
Evaluation Methods:

A. Course Requirements:

1. Participation in all business visits.

The entire class is designed to prepare you to ask insightful questions during our business visits based upon research you will do on each organization prior to our visit. Your grade will be awarded based on the quantity and quality of questions and your professionalism during the entire visit abroad. Everyone is expected to act in a manner consistent with understanding that you are guests of the British people and that the laws and social rules of UK apply. Further, in light of the risk of terrorism you are expected to follow all rules imposed on us during the visits and travel.

There will be a strong emphasis on daily preparation and participation. You must be fully prepared to discuss issues prepared for each visit. Since the participation is crucial for students' learning, attendance is mandatory for all activities. Several students will be randomly nominated to help lead discussions on the organization. Students are evaluated for the participation according to the quality and persistence in their discussion and their attendance. Absences will affect a student's final grade.

2. Paper experience

There will be one project. Each student will write a paper on analyzing the impact the visit had on his/her understanding of the maritime industry issue and the UK culture. The paper must address the impact the trip had on the strategy for your career in the industry.

B. Grading Standards

<table>
<thead>
<tr>
<th>Written Report</th>
<th>50 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>20 points</td>
</tr>
<tr>
<td>Discussion participation</td>
<td>30 points</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

Each project and all class participation will be given one of the following letter grades:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numerical equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B</td>
<td>80-89</td>
</tr>
<tr>
<td>C</td>
<td>70-79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>below 60</td>
</tr>
</tbody>
</table>

Grading is one of the most sensitive issues a faculty member faces. Fairness in grading is the guiding objective but this has many dimensions (e.g. a student has a right to be tested only on material available through the syllabus or lectures up through the time of the examination; students in the same class should not be treated differently; students who have legitimate absences should be offered a chance to make-up their examination, etc.) One paradox is that objective examinations (e.g. multiple choice) are, by definition, less prone to unfairness in grading than subjective (essay) examinations and cases, yet are often viewed by students as an unfair test of their knowledge of courses in which the critical parts have subjective content (e.g. decision making processes). Also a resource constraint exists: students are entitled to a careful reading of their essays but limited faculty time must be allocated over many competing uses.
There is no solution to this dilemma, just uneasy compromises. The system of grading and examination in this course has evolved through the suggestions of students. Please provide me your thoughts for improvement.

**Statement of Course Evaluations:**
The Pica (Personalized Instructor/Course Appraisal) is an online course evaluation for Texas A & M. We highly encourage you to complete an evaluation for each course on your schedule. Student input is a critical component used to improve curriculum and teaching. Each faculty member values your input to improve his/her methodology. Your comments can also significantly impact the mix and membership of the faculty. The PICA website is available at [http://pica.tamu.edu](http://pica.tamu.edu), your howdy portal, or by scanning the block notes around campus.

**CLASS POLICIES:**
*Academic honesty*

**AGGIE HONOR CODE**

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

Upon accepting admission to Texas A & M University at Galveston, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMUG community from the requirements or the processes of the TAMUG Honor System.

For additional information please visit: [http://www.tamug.edu/honorsystem/](http://www.tamug.edu/honorsystem/)

**Statement on the Americans with Disabilities Act (ADA) of 1990**
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 Counseling Office, Northern Student Center, or call (409)740-4587. For additional information visit [http://www.tamug.edu/counsel/dssprocedure.htm](http://www.tamug.edu/counsel/dssprocedure.htm).

**Statement on the Family Educational Rights and Privacy Act (FERPA)**
FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. To obtain a listing of directory information or to place a hold on any or all of this information, please consult the Admissions & Records Office.

Items that can never be identified as public information are a student’s social security number or institutional identification number, citizenship, gender, grades, GPA, or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

**Use of Cell Phone, Blackberries, Laptops, etc.**
The inappropriate use of electronic devices will reflect poorly on your attendance grade.

**Statement on Absences**
Information concerning absences is contained in the University Student Rules Section 7. The University views class attendance as an individual student responsibility. All students are expected to attend class and to complete all assignments. Please consult the University Student Rules for reasons for excused absences, detailed procedures and deadlines as well as student grievance procedures (Part III, Section 45).

Discussion Atmosphere
Any true discussion involves personal exposure and risk. Your ideas may not agree with others. However, respect is required from you and thus will be given to you. Rudeness in any fashion will not be tolerated and will result in expulsion from the meeting.

Negotiation
Any and all of the above except academic integrity is negotiable as a class with the instructors.

ADDITIONAL COMMENTS REGARDING THE SIGNIFICANCE OF THE COURSE IN TERMS OF HISTORY, MOMENT, MOVEMENT, TRENDS, TIMELINES, BODY OF BASIC KNOWLEDGE, ETC.
None
The content of this outline and the attached schedule are subject to change at the discretion of the professors.

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

Form Instructions

1. Course request type:  
   □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):  
   Department of Materials Science and Engineering

3. Course prefix, number and complete title of course:  
   MSEN 612 Fundamentals of Transmission Electron Microscopy

4. Catalog course description (not to exceed 50 words):  
   State-of-the-art fundamentals in TEM; theoretical background supporting a strong hands-on course component comprising specimen preparation and image acquisition/interpretation; practical experience to attain a proficiency level permitting independent operation of one of the transmission electron microscopes in the Microscopy and Imaging Center.

5. Prerequisite(s):  
   Instructor approval; students are required to write a half-page summary describing the specific problem they wish to resolve using electron microscope; graduate classification.

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

7. 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

8. Will this course be submitted to the Core Curriculum Council?  
   □ Yes  □ No

9. This course will be:  
   a. required for students enrolled in the following degree programs(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., Ph.D., Materials Science and Engineering

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

11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)

<table>
<thead>
<tr>
<th>MSEN</th>
<th>612</th>
<th>Fundamentals of TEM</th>
</tr>
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<tbody>
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<td>Lab</td>
<td>SCH</td>
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<tr>
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<td>0 3 4 1 0 1 0 1 0 0 0 2</td>
<td>0 8 6 4 1 5 - 1 6 0 0 3 6 3 2</td>
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</tbody>
</table>

Approval recommended by:

Thomas D. McKnight  
Department Head or Program Chair (Type Name & Sign)  
Date

John Criscione  
Chair, College Review Committee  
Date

Mladen Radovic  
Department Head or Program Chair (Type Name & Sign)  
Date

(If cross-listed course)

John Criscione  
Dean of College  
Date

Submitted to Coordinating Board by:

Chair, GE or Chair  
Date  
Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
BIOL 602 / MSEN 612
TEM I: Fundamentals of Transmission Electron Microscopy (3 credits)
Fall 2016

<table>
<thead>
<tr>
<th>Instructor</th>
<th>e-mail</th>
<th>telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Andreas Holzenburg</td>
<td><a href="mailto:holzen@tamu.edu">holzen@tamu.edu</a></td>
<td>845-1129</td>
</tr>
<tr>
<td>Dr. Hansoo Kim</td>
<td><a href="mailto:luminesc@tamu.edu">luminesc@tamu.edu</a></td>
<td>845-1129</td>
</tr>
<tr>
<td>Mr. Rick Littleton</td>
<td><a href="mailto:rick-littleton@tamu.edu">rick-littleton@tamu.edu</a></td>
<td>845-1129</td>
</tr>
<tr>
<td>Dr. Michael Pendleton</td>
<td><a href="mailto:mikep@tamu.edu">mikep@tamu.edu</a></td>
<td>845-1129</td>
</tr>
</tbody>
</table>

Office hours:
Tuesday and Thursday, 1:00 to 5:00 p.m.

Location

Course Description:
State-of-the-art fundamentals in TEM; theoretical background supporting a strong hands-on course component comprising specimen preparation and image acquisition/interpretation; practical experience to attain a proficiency level permitting independent operation of one of the transmission electron microscopes in the Microscopy and Imaging Center.

Prerequisites:
The course is suitable for students in both Life and Material Sciences. Please note that due to limited beam time and number of microscopes available, enrollment is limited. Prospective students are required to write a half-page summary describing the specific problem they wish to resolve using transmission electron microscopy.

Course format:
Lectures and Laboratories: Integrated over the entire semester, there will be two one-hour theory sessions per week as well as a three-hour laboratory (e.g. Tuesday and Thursday, 2-5 p.m. and other slots to be determined with the individual instructor). This format permits sufficient familiarization time with the electron microscopes as well as time to assimilate the required theoretical background knowledge while keeping an overall workload compatible with a 3-credit course. The laboratories each week will involve demonstrations by the MIC staff and hands-on experience by each student at each laboratory. Laboratory handouts will be provided by the MIC staff as necessary. Following the training and practice sessions, each student will be required to pass an instrument exam which grants the student independent operation of that instrument. Two hours free instrument time per week are granted to each registered student who has successfully completed the instrument exam. The course will conclude with a poster presentation relating to the student’s research project.

Homework:
Each student is required to prepare a poster describing a basic structural analysis of their specimen examined in the TEM during the course. The poster should comprise three sections:
introduction, materials & methods and results & discussion (including presentations of micrographs, EM-specific annotations, figure legends, image interpretation etc.).

**Reading Material:**
Lectures will be supplemented by handouts and the eBook available through the Texas A & M libraries (or a hardcopy if the student wishes to purchase it) Bozzola, J. J. and Russell, L. D. 1999. *Electron microscopy principles and techniques for biologists*. Jones and Bartlett Publishers. [It is possible to purchase discounted copies from Amazon.com.]

N.B. This text is also appropriate for TEM beginners from the Material Sciences.

**eBook info:** http://web.ebscohost.com/ehost/detail?sid=9e52b884-f9ef-4277-ab84-0a50f3c3e7fd%40sessionmgr104&vid=1&hid=107&bdata=JnNpdGU9ZWhvc3QtGCl2ZQ%3d%3d#db=nlebk&AN=2557

**Grading:**
There are three pieces of assessed coursework: the poster (accounting for 25% of the grade), a written exam (accounting for 45%), and a successful instrument exam (practical exam conducted on the microscope) accounting for 30% of the final grade. Being eligible for the practical examination is contingent upon passing the written exam. The minimum score is 60%. Only one re-take within one week is allowed, and the maximum score for a re-take exam is 60%. **Please note, in order to pass the course, a student must have passed the written exam as well as the instrument exam.** The latter means that the candidate has been found to be properly qualified to independently operate one of the TEMs. This will be confirmed by a certificate handed out to the student.

**Grading scale**
A = 90 and more  
B = 80 – 89  
C = 70 – 79  
D = 60 – 69  
F < 60

**Learning outcomes**
Students will gain sufficient proficiency in sample preparation, image acquisition and interpretation and transmission electron microscope preparation to independently operate the microscope to a level that contributes to the accomplishment of their research needs.

**Class Schedule (by week)**

1. Welcome and introduction to the course and TEM  
   - Course structure, overview of TEM: history, instrumentation components, resolution, focusing, specimen requirements, documentation.  
   **LAB:** First TEM demonstration:
- Biological sample;
- Material sample: Amorphous and crystalline materials.

2. Safety first
- Overview of laboratory safety as it applies to transmission electron microscopy
**LAB**: Grid preparation: Preparation of support films and holey grids for alignment; use of the Cressington R308 vacuum coater.

3. Data recording and presentation
- Selection of electron micrographs, calibrated magnifications, photography, digital imaging.
**LAB**: Basic TEM operation, image acquisition and basic image processing.

4. Electron sources and Vacuum Systems
- Tungsten; LaB₆; FEG.
- Mechanical pumps; diffusion pumps; turbomolecular pumps; ion getter pumps.
**LAB**: TEM operation.

5. Electron optics and interaction of electrons with matter
- Construction of TEM; lenses; apertures; interaction of electrons with matter: elastic scattering and inelastic scattering, beam damage, accelerating voltage and resolution
**LAB**: TEM operation and alignment.

6. Basic alignment of TEM
- Alignment of electron gun, condenser lens, objective lens.
**LAB**: TEM practice and alignment.

7. Theory review
- Relating theory to practical aspects.
**LAB**: TEM operation.

8. Written Exam (1.5h)

9. Basic specimen preparation techniques
- Biological sample;
- Materials sample.
**LAB**: Sample preparation
- Preparation of biological sample by negative staining and examination in the TEM;
- Preparation of material samples by crushing powders and deposition onto carbon-coated grids followed by examination in the TEM.

10. Troubleshooting: Questions and answers
- no beam, beam instabilities, vacuum problems, low contrast, dark room issues
**LAB**: Specimen preparation of students’ own specimens and examination in the TEM
11.-15. Application-oriented theory sessions:
- Specialized and student's project-based applications and **poster preparation, presentation and discussion sessions**
**LABS:** Supervised practice sessions towards independent TEM operation, preparation for the instrument exam and solving individual specimen preparation problems.

**Americans with Disabilities Act (ADA) Policy Statement**
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**TAMU classroom policy for absence related to injury or illness**
**Student Rule 7. Attendance:** [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07)
7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Among the reasons absences are considered excused by the university are the following:

7.1.6 Injury or illness that is too severe or contagious for the student to attend class.

7.1.6.1 Injury or illness of three or more days. For injury or illness that requires a student to be absent from classes for three or more university business days (to include classes on Saturday), the student should obtain a medical confirmation note from his or her medical provider. The Student Health Center or an off-campus medical professional can provide a medical confirmation note only if medical professionals are involved in the medical care of the student. The medical confirmation note must contain the date and time of the illness and medical professional's confirmation of needed absence.

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In the case where a student has potentially provided falsified documentation or otherwise cheated, the instructor will utilize the Aggie Honor System (http://www.tamu.edu/aggiehonor/index.html).
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus. •

Form Instructions:
1. Course request type: [ ] Undergraduate [X] Graduate [ ] First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Department of Materials Science and Engineering
   MSEN 613 Advanced Transmission Electron Microscope (TEM) Methodologies in Life and Materials Science (TEM II)
3. Course prefix, number and complete title of course: BIOL 602/MSEN 612; graduate classification
   Cross-listed with: BIOL 603
   Stacked with: 
   Cross-listed courses require the signature of both department heads.
4. Catalog course description (not to exceed 50 words): Advanced TEM methodologies, including specimen preparation and TEM imaging/analysis techniques as applicable to both biological and material samples; theory designed to support a strong hands-on component comprising specimen preparation, different imaging/diffraction/spectroscopic techniques and data interpretation.
5. Prerequisite(s): [X] BIOL 602/MSEN 612; graduate classification
   Cross-listed with: [X] BIOL 603
   Stacked with: 
   Is this a variable credit course? [ ] Yes [X] No
   If yes, from _______ to _______
   Is this a repeatable course? [ ] Yes [X] No
   If yes, this course may be taken ______ times.
   Will this course be repeated within the same semester? [ ] Yes [X] No
   Will this course be submitted to the Core Curriculum Council? [ ] Yes [X] No
   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., Ph.D., Materials Science and Engineering
10. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.
   [X] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).
12. Prefix Course # Title (excluding punctuation)

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   Approval recommended by: [ ] Level 6
   [ ] John Criscione
   [ ] Chair, College Review Committee
   [ ] Date
   [ ] 8/14/14
   [ ] Thomas D. McKenzie
   [ ] Department Head or Program Chair (Type Name & Sign)
   [ ] Date
   [ ] 8/14/14

   [ ] Miladin Rasic
   [ ] Department Head or Program Chair (Type Name & Sign)
   [ ] Date
   [ ] 8/14/14

   [ ] Karen Dudley
   [ ] Chair, GC or UCC
   [ ] Date
   [ ] 8/14/14

   Submitted to Coordinating Board by:

   [ ] Associate Director, Curricular Services
   [ ] Date
   [ ] Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
SYLLABUS

BIOL 603/ MSEN 613
Fall 2015

Advanced Transmission Electron Microscopy (TEM II)

Instructors: Andreas Holzenburg, Ph.D.
holzen@tamu.edu, 845-1129
Office hours 1:00 – 5:00 p.m.
1137B ILSB

Hansoo Kim, Ph.D,
luminesc@tamu.edu, 845-1129
1129 ILSB

Rick Littleton
Rick-littleton@tamu.edu, 845-1129
1131 ILSB

Location: Microscopy and Imaging Center
Office hours: Mon and Wed 1:00 – 5:00 p.m.

Class meeting times: TBD
Location: Interdisciplinary Life Science Building (ILSB) 1143


This 3-credit course in TEM has a strong emphasis on advanced data acquisition, analysis and interpretation. This course normally requires successful completion of Fundamentals of Transmission Electron Microscopy (TEM I; BIOL 602/MSEN 612) or equivalent experience; i.e. demonstrated proficiency in the independent operation of a transmission electron microscope. This will be waived if specific needs, e.g. specimen preparation, can be demonstrated by the student.

COURSE DESCRIPTION

This course is designed to provide students with advanced TEM methodologies including specimen preparation and TEM imaging/analysis techniques as applicable to both biological and material samples. Students will be equipped with the necessary theoretical background in support of a strong hands-on laboratory component comprising specimen preparation, different imaging/diffraction/spectroscopic techniques and data interpretation.

LEARNING OUTCOMES

Students will gain sufficient proficiency in sample preparation, image acquisition and interpretation, and transmission electron microscope preparation to independently operate the microscope to a level that contributes to the accomplishment of their research.

LECTURES AND LABORATORY
For the first several weeks of this course, there will be two 1-hour theory and application-oriented theory sessions (1:00 – 2:00 p.m.) per week. These sessions will involve theory of the techniques and practical applications with common and advanced protocols as well as algorithms to determine the best protocol or combination of techniques for the problem at hand. In the latter weeks of the semester, the lecture time slot will be devoted to laboratory discussion of and practical application of TEM to students’ research projects.

In addition to the theory and application-oriented theory sessions, there will be two 3-hour laboratory sessions (2:00–5:00 p.m.) per week over the entire 10-week period. These two laboratories each week will involve demonstrations by the MIC staff, hands-on experience by each student to re-enforce the theory sessions, and time for the students to advance their own research projects under lighter supervision. Moreover, students may spend time additional to the scheduled hours doing laboratory work (prep and TEM) as required by their project.

**HOMEWORK:** Each student is required to prepare a final two-page write-up (see below).

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**GRADING**

There are two pieces of assessed coursework each accounting for 50% of the grade: an exam paper based on the lecture material probing the theoretical knowledge level attained, and a write-up in the style of a short (2 pages) research paper including an Introduction, Materials & Methods, Results and Discussion. The assessment of which takes into consideration as to whether the student is able to (i) correctly annotate and interpret the images/diffraction patterns, spectra etc. and (ii) critically appraise his/her results in the light of the relevant current literature.

**Grading scale**

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- B = 80 – 89
- C = 70 – 79
- D = 60 – 69
- F < 60

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**THE AMERICANS WITH DISABILITIES ACT**

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**ACADEMIC INTEGRITY**

The Aggie Honor Code: An Aggie does not lie, cheat, or steal, or tolerate those who do. Academic misconduct, a violation of the Texas A&M Honor System, involves any of the following: cheating, fabrication, falsification, multiple submission, plagiarism, and complicity. For explanations and examples of what constitutes academic dishonesty visit http://
COPYRIGHTS
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TAMU CLASSROOM POLICY FOR ABSENCE RELATED TO INJURY OR ILLNESS
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Course Topics Schedule for TEM II (Material Sciences)

| Weeks 1-6 | Theory and application-oriented theory session 1. Sample preparation. Overview of TEM |
sample preparation techniques for diverse materials. 1 h

**Lab 1.** Practice of sample preparation: cutting, grinding, polishing, dimpling and ion milling. 3 h

**Theory and application-oriented theory session 2.** Electron diffraction I. Formation and indexing of selected-area electron diffraction patterns, poly-ring patterns. 1 h

**Lab 2.** Practice of electron diffraction in TEM and indexing using dedicated software. 3h

**Theory and application-oriented theory session 3.** Electron diffraction II. Kikuchi patterns, convergent-beam electron diffraction (CBED). 1 h

**Lab 3.** Practice of Kikuchi line acquisition and analysis and CBED. 3h

**Theory and application-oriented theory session 4.** Imaging I. Imaging contrast, bright-field (BF) and dark-field (DF) imaging; weak-beam dark-field (WBDF) imaging; two-beam condition and crystal defect identification. 1 h

**Lab 4.** BF, DF, two-beam WBDF imaging, identification of dislocation Burgers vectors. 3h

**Theory and application-oriented theory session 5.** Embedding and staining for materials. Epoxy and acrylic resin components and formulations: staining theory and practice. 1 h

**Lab 5.** Making glass knifes; cutting semi-thin sections; practice in embedding and staining. 3h

**Theory and application-oriented theory session 6.** Principles of ultramicrotomy and glass knife preparation. 1 h

**Lab 6.** Cutting ultra-thin materials sections. 3h.

**Theory and application-oriented theory session 7.** Imaging II. Principles of high-resolution electron microscopy (HREM); HREM data processing and interpretation. 1 h

**Lab 7.** High-resolution lattice imaging and image simulation. 3h

**Theory and application-oriented theory session 8.** Compositional analysis and related techniques. Energy dispersive spectroscopy (EDS), electron energy-loss spectroscopy (EELS), electron spectroscopic imaging (ESI), semi-STEM and STEM. 1 h

**Lab 8.** EDS data collection and elemental identification. 3h

**Theory 9-11.** Theory expansion slots and Review prior to exam

**Lab 9-11.** Continuation of Lab 8. 3h

**Theory 12.** Written exam

**Weeks 7-10**

**Continuation of lab sessions 2 x 3 h per week fostering students' own project work.**

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

Form Instructions

1. Course request type: □ Undergraduate □ Graduate □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name): Materials Science and Engineering
   MSEN 614 Fundamentals of Scanning Electron Microscopy (SEM) and Environmental Scanning Electron Microscopy (ESEM)
3. Course prefix, number and complete title of course: MSEN 614 Fundamentals of Scanning Electron Microscopy (SEM) and Environmental Scanning Electron Microscopy (ESEM)
4. Catalog course description (not to exceed 50 words): Provides biologists, material scientists, and students from other disciplines with the techniques of operation of the scanning electron microscope (SEM) and the environmental SEM (ESEM) coupled with the appropriate theoretical background knowledge; individual instruction in support of their research endeavors involving SEM/ESEM.

5. Prerequisite(s):
   Cross-listed with: BIOI 604
   Stacked with:
   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course? □ Yes □ No If yes, from _____ to _____
7. 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
8. Will this course be submitted to the Core Curriculum Council? □ Yes □ No
9. This course will be:
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   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   M.S., Ph.D., Materials Science and Engineering
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    Attach approval letters.
11. □ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix Course # Title (excluding punctuation)
    MSEN 614 FUNDAMENTAL SEM/ESEM

   Lect. Lab SCI CIP and Fund Code Admin. Unit Acad. Year HCE Code
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   Approval recommended by:

   Thomas D. McKnight (BME) Chair, College Review Committee
   Department Head or Program Chair (Type Name & Sign) Date
   Miladin Radovic (MSEN) Dean of College
   Department Head or Program Chair (Type Name & Sign) Date
   (if cross-listed course)

   Submitted to Coordinating Board by:

   Associate Director, Curricular Services

   Date Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Fundamentals of Scanning Electron Microscopy (SEM) and Environmental Scanning Electron Microscopy (ESEM)

BIOL 604 • MSEN 614
Fall 2015

Credits: 2
Enrollment Limit: normally 12 (configuration-dependent)
Prerequisites: Graduate classification

Instructor: Dr. Andreas Holzenburg
holzen@tamu.edu
979-845-1164

Office hours
Tuesday and Thursday 1:00 – 3:00 p.m.
1137B Interdisciplinary Life Science Building

Meeting times: TBD
Location: 1143 Interdisciplinary Life Science Building (ILSB)

Course Description
This course will provide students independent of their background and discipline of study with the theoretical background and techniques of operation of a scanning electron microscope (SEM) and the principle of an environmental scanning electron microscope (ESEM). In addition, students will receive individual instruction, which will facilitate the completion of their later research involving SEM and/or ESEM.

Course Format
The lecture portion of the course will amount to one hour per week when integrated over the entire semester while the laboratory portion of the course will be three hours per week. The class meets for lectures every Tue and Thu at 1 pm up to the written exam, which will cover the topics presented in the lectures. Laboratory sessions will allow the students to receive training on the operation of one of the SEMs in the MIC, depending on the student’s project requirements. Following the training and practice sessions, each student will be required to pass an instrument exam which grants the student independent operation of that instrument. Two hours free instrument time per week are granted to each registered student who has successfully completed the instrument exam. The course will conclude with a poster presentation relating to the student’s research project.

Learning outcomes
Conceptual understanding of the basic underlying principles that enable the formation of images and elemental analysis spectra in a scanning electron microscope [SEM] and environmental SEM. Development of an appreciation for the interdependency and weighting of parameters. Application of this knowledge base to the hands-on operation of a scanning electron microscope with the view to become an intelligent user who is able to establish the most appropriate imaging[elemental analysis] conditions for the specimen at hand. Being able to judge specimen compatibility and perform procedures that will lead to SEM-compatible specimens.


**Homework**

Each student is required to prepare a poster describing a basic structural analysis of a specimen examined in the SEM during the course. The poster should comprise three sections: 1) Introduction, 2) Materials & Methods and 3) Results & Discussion (including presentations of micrographs with SEM-specific annotations, figure legends, and image interpretation).

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**Grading**

There are three pieces of assessed coursework: the poster (accounting for 25% of the grade), a written exam (accounting for 45%), and a successful instrument exam, accounting for 30% of the final grade. Being eligible for the practical examination is contingent upon passing the written exam (minimum score 60%). Only one re-take within one week is allowed and the maximum score for a re-take exam is 60%. In order to pass the instrument exam, a student must have been found to be properly qualified to independently operate one of the SEMs. This will be confirmed by a certificate handed out to the student.

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**Recommended Books**


(a very concise, yet comprehensive introductory textbook also covering TEM)

(adjacent and specialized text providing in-depth coverage of EDS and related techniques)

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7.1.6.2 Injury or illness less than three days. Faculty members may require confirmation of student injury or illness that is serious enough for a student to be absent from class for a period less than three university business days (to include classes on Saturday). At the discretion of the faculty member and/or academic department standard, as outlined in the course syllabus, illness confirmation may be obtained by one or both of the following methods: a. Texas A&M
University Explanatory Statement for Absence from Class form available at http://attendance.tamu.edu/ b. Confirmation of visit to a health care professional affirming date and time of visit.

7.1.6.3 An absence for a non-acute medical service does not constitute an excused absence. In the case where a student has potentially provided falsified documentation, the instructor should utilize the Aggie Honor System (http://aggiehonor.tamu.edu).

### Lecture Topics

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>First meeting</td>
<td>Organization of the course and scheduling of the labs</td>
</tr>
<tr>
<td>Lecture 1:</td>
<td>Safety lecture, tour of the Center</td>
</tr>
<tr>
<td>Lecture 2:</td>
<td>Introduction to SEM and ESEM</td>
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<tr>
<td>Lecture 3</td>
<td>Vacuum systems in the SEM</td>
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<tr>
<td>Lecture 4</td>
<td>Electron optics Basic instrument design. Electron lenses, Electron</td>
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<tr>
<td></td>
<td>probe diameter (spot size). Resolution</td>
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<tr>
<td>Lecture 5</td>
<td>Beam interaction factors. Electron scattering processes, Interaction</td>
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<tr>
<td></td>
<td>volume, Backscatter electron imaging, Secondary electron imaging,</td>
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<td></td>
<td>Magnification. Image distortions. Detector designs</td>
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<tr>
<td>Lecture 6</td>
<td>Digital imaging versus the analog approach, Proprietary software, File</td>
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<td>formats. Image manipulation and scientific ethics.</td>
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<tr>
<td>Lecture 7</td>
<td>Special applications. Energy-dispersive analysis (EDS), Wavelength-</td>
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<tr>
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<td>dispersive spectroscopy (WDS), Cathodoluminescence (CL)</td>
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<tr>
<td>Lecture 8</td>
<td>Theory review</td>
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<tr>
<td>Lecture-slot 9</td>
<td>Written exam</td>
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<tr>
<td>Lecture 10</td>
<td>Troubleshooting: Questions and answers (1 h) - no beam, beam</td>
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<tr>
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<td>instabilities, vacuum problems, low contrast</td>
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<tr>
<td>Lectures 11 to end:</td>
<td>Application-oriented theory sessions: specialized and students'</td>
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<td>project-based applications, poster preparation, project presentation</td>
</tr>
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<td>and discussion sessions (1 hour per week or as required).</td>
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</table>

### Labs

Supervised practice sessions towards independent SEM operation, preparation for the instrument exam and solving individual specimen preparation problems (3 hours per week).

**Laboratory**

<table>
<thead>
<tr>
<th>Lab. 1</th>
<th>Schedule Introduction to the SEM. Safe use of the microscope.</th>
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</thead>
<tbody>
<tr>
<td>Labs. 2 and 3</td>
<td>Sample preparation techniques</td>
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<tr>
<td>Lab. 4</td>
<td>SEM basic operation. Instructor in SEM room with students</td>
</tr>
<tr>
<td>Lab. 5</td>
<td>SEM basic operation. Instructor in SEM room with students.</td>
</tr>
<tr>
<td>Lab. 6</td>
<td>Instructor close to the SEM but students operating scope</td>
</tr>
<tr>
<td></td>
<td>independently</td>
</tr>
</tbody>
</table>
| Lab. 7      | SEM operation and image collection.  
|            | Instructor close to the SEM but students operating scope independently |
| Lab. 8     | SEM practice **and check-out**.  
|            | Following check-out, independent work on projects.  
|            | EDS training for students if interested.  
|            | Limits will be imposed on hours per week for class project beam time |
| Labs 9 to end | Independent work on projects. Limits will be imposed on hours per week for class project beam time. |
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Course request type:
   - [ ] Undergraduate
   - [X] Graduate
   - [ ] First Professional (e.g., DVM, JD, MD, etc.)

2. Request submitted by (Department or Program Name):
   Department of Materials Science and Engineering

3. Course prefix, number and complete title of course:
   MSEN 618 Composite Materials Processing and Performance

4. Catalog course description (not to exceed 50 words):
   Fundamental science and design; processing and design interaction regarding
   multiphase composites; processing science, experimental characterization, laminate analysis; design structure and processing.

5. Prerequisite(s):
   Elasticity, continuum mechanics, or equivalent; graduate classification

Cross-listed with:
- MSEN 686

Stacked with:
- MSEN 471

Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?
   - [ ] Yes
   - [X] No
   If yes, from _______ to _______

7. Is this a repeatable course?
   - [ ] Yes
   - [X] No
   If yes, this course may be taken _______ times.

   Will this course be repeated within the same semester?
   - [ ] Yes
   - [ ] No

8. Will this course be submitted to the Core Curriculum Council?
   - [ ] Yes
   - [X] No

9. 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. Eng, M.S., Ph.D., Materials Science and Engineering

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

    Attach approval letters.

11. [X] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix | Course # | Title (excluding punctuation)
        | MSEN 618 | COMPOSITES PROCESSING

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCI</th>
<th>CIP and Fund Code</th>
<th>Admin Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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</tbody>
</table>

Approval recommended by:

Mladen Radovic (MSEN)
Department Head or Program Chair (Type Name & Sign)
Date: 7/14/14

John Criscione
Chair, College Review Committee
Date: 3/14/14

Alan Palazzolo (MSEN)
Department Head or Program Chair (Type Name & Sign)
Date: 7/14/14

Dean of College
Date: 8/14/14

Karen Butler-Davis
Chair, GC or UCC
Date: 9-22-14

Submitted to Coordinating Board by:

Date:

Associate Director, Curricular Services

Date:

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
# SYLLABUS

**MSEN 626/MEEN 471/MEEN 686**  
Fall 2015

**MEEN 471 Elements of Composite Materials**  
**MSEN 618/MEEN 686 Composite Materials Processing and Performance**

| Class meeting times: TBD  
| Location: TBD  

**INSTRUCTOR INFORMATION**  
Instructor: Prof. Terry Creasy  
Tel: 979-458-0118  
(The system digitizes voice mail and sends it to my email)  
E-mail: tcreasy@tamu.edu  
Office: 526 MEOB  
Office Hours: Monday, Tuesday, and Thursday 1:00 p.m. to 2:00 p.m. or by appointment

## DESCRIPTION

Fundamental science and design; processing and design interaction regarding multiphase composites; processing science, experimental characterization, laminate analysis; design structure and process. (3 credits)

## PREREQUISITES:
Elasticity, continuum mechanics, or equivalent; graduate classification

## COURSE LEARNING OUTCOMES

When this course ends students should have these abilities:

1. use fundamental equations, self-authored software, or commercial software to obtain orthotropic material properties for a specific composite laminate;
2. use fundamental equations or finite element software to find the loads applied to a component, the laminate that supports those loads with allowable displacements, and to state whether the composite is a better choice than other materials;
3. understand composite material’s benefits and limitations;
4. calculate lamina properties from fiber and matrix properties;
5. select processing methods based on the product form and material properties.

## TEXTBOOK AND OTHER REQUIRED MATERIAL

## COURSE CALENDAR
The course calendar might change to better accommodate the learning objectives or to adjust for inclement weather, power failures, or other issues. Dr. Creasy will post a new calendar to elearning and announce the changes in lecture.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture</th>
<th>Content</th>
<th>Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>20-Aug</td>
<td>1</td>
<td>Syllabus, Project, Concepts</td>
<td>Ch1, pp. 1-21</td>
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<tr>
<td>1-Sep</td>
<td>2</td>
<td></td>
<td>Fiber Reinforcement</td>
<td>Ch 2, pp. 27-41</td>
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<tr>
<td>2</td>
<td>6-Sept</td>
<td>3</td>
<td>Solidworks, FEA</td>
<td>None or handout</td>
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<tr>
<td>8-Sept</td>
<td>4</td>
<td></td>
<td>Matrix Materials (Undergraduate teams and individual graduate students submit Project Request)</td>
<td>Ch 2. pp. 41-57</td>
</tr>
<tr>
<td>3</td>
<td>13-Sep</td>
<td>5</td>
<td>Properties (Projects Approved/Revised)</td>
<td>Ch 2. pp. 57-70</td>
</tr>
<tr>
<td>15-Sep</td>
<td>6</td>
<td></td>
<td>Manufacturing Processes</td>
<td>Ch 3. pp. 71-90</td>
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<tr>
<td>4</td>
<td>20-Sep</td>
<td>7</td>
<td>Micromechanics--the basic, stiffness</td>
<td>Ch 4. pp. 91-105</td>
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<td>22-Sep</td>
<td>8</td>
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<td>Stiffness, Moisture and Thermal Expansion</td>
<td>Ch 4. pp. 105-116</td>
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<td>5</td>
<td>27-Sep</td>
<td>9</td>
<td>Strength I</td>
<td>Ch 4. pp. 116-129</td>
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<td>29-Sep</td>
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<td>Strength II</td>
<td>Ch 4. pp. 129-142</td>
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<td>4-Oct</td>
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<td>Solidworks FEA</td>
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<td>6-Oct</td>
<td>12</td>
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<td>Exam 1 (undergraduate and graduate students)</td>
<td>Covers Ch 1-4</td>
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<tr>
<td>7</td>
<td>11-Oct</td>
<td>13</td>
<td>Exam Return and Lecture</td>
<td>None or handout</td>
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<td>13-Oct</td>
<td>14</td>
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<td>Midterm Project Reviews(5 min) Graduate students only.</td>
<td>None or handout</td>
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<td>18-Oct</td>
<td>15</td>
<td>Ply Mechanics I</td>
<td>Ch 5. pp. 143-159</td>
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<tr>
<td>20-Oct</td>
<td>16</td>
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<td>Ply Mechanics II</td>
<td>Ch 5. pp. 159-166</td>
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<tr>
<td>10</td>
<td>1-Nov</td>
<td>19</td>
<td>Design with Carpet Plots</td>
<td>Ch 6. pp.201-216</td>
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<tr>
<td>3-Nov</td>
<td>20</td>
<td></td>
<td>Carpet Plots, Hygrothermal Stresses</td>
<td>Ch 7. pp.217-233</td>
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<tr>
<td>11</td>
<td>8-Nov</td>
<td>21</td>
<td>Strength and Failure Criteria</td>
<td>Ch 7. pp.233-252</td>
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<tr>
<td>10-Nov</td>
<td>22</td>
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<td>Strength Design with Carpet Plots</td>
<td>Ch 7. pp.252-266</td>
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<tr>
<td>12</td>
<td>15-Nov</td>
<td>23</td>
<td>Demo or Problem Session</td>
<td>None or handout</td>
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<tr>
<td>17-Nov</td>
<td>24</td>
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<td>Exam 2 (undergraduate and graduate students)</td>
<td>Covers Ch 1-7</td>
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<tr>
<td>13</td>
<td>22-Nov</td>
<td>25</td>
<td>Exam Return and Project Presentations</td>
<td>None</td>
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<tr>
<td>24-Nov</td>
<td></td>
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<td>Thanksgiving Day</td>
<td>None</td>
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<td>14</td>
<td>29-Nov</td>
<td>26</td>
<td>Project Presentations</td>
<td>None</td>
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<tr>
<td>1-Dec</td>
<td>27</td>
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<td>Project Presentations</td>
<td>None</td>
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</tbody>
</table>

**Prepared by Terry S. Creasy**
### Component value (%) | Letter grade
--- | ---
Attendance and participation | A 90% or better
Design guide/Notebook | B 80 to 89%
Homework | C 70 to 79%
Final project | D 60 to 69%
Exams | F less than 60%

This is a stacked course (undergraduate and graduate sections meeting concomitantly). Undergraduate students will have two midterm exams and a final project with groups of three or four students designing a product made from composite materials. Graduate students will have two midterm exams, a final exam, and an individual design project with a midsemester design review and a final presentation.

### ABSENCE POLICY
Dr. Creasy accepts illness self-declaration for illnesses lasting three days or less with this exception: if you miss an exam because you are ill, you must see a doctor and get a medical excuse. Reference Student Rule 7. (http://student-rules.tamu.edu/rule07) for more information and make-up policy.

### TOPICS COVERED:
- Materials science for composite materials
- Micromechanics, solid mechanics, and lamination theory for composite materials
- Processing methods for composite structures
- Finite element analysis for orthotropic structures
- Failure and damage in composites including test methods

### AMERICANS WITH DISABILITIES ACT (ADA):
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. For additional information visit http://disability.tamu.edu

### ACADEMIC INTEGRITY:
For additional information please visit http://aggiehonor.tamu.edu “An Aggie does not lie, cheat, or steal, or tolerate those who do.”
Texas A&M University  
Departmental Request for a New Course  
Undergraduate ♦ Graduate ♦ Professional  
* Submit original form and attach a course syllabus. *

**Form Instructions**

1. Course request type:  
   - [ ] Undergraduate  
   - [x] Graduate  
   - [ ] First Professional (ex. DVM, JD, MD, etc.)

2. Request submitted by *(Department or Program Name):*  
   Department of Materials Science and Engineering

3. Course prefix, number and complete title of course:  
   MSEN 626 Polymer Laboratories

4. Catalog course description (not to exceed 50 words):  
   Introduction to basic experimental skills relating to polymers; experiments include polymerization, molecular weight determination, FTIR, tensile test, NMR, DSC, swelling index, viscosity, x-ray diffraction.

---

5. Prerequisite(s):  
   Graduate classification

   Cross-listed with:  
   - [ ] MSEN 626
   Stacked with:

   Cross-listed courses require the signature of both department heads.

6. Is this a variable credit course?  
   - [ ] Yes  
   - [x] No  
   If yes, from ________ to ________

7. Is this a repeatable course?  
   - [ ] Yes  
   - [x] No  
   If yes, this course may be taken ________ times.

   Will this course be repeated within the same semester?  
   - [ ] Yes  
   - [ ] No

8. Will this course be submitted to the Core Curriculum Council?  
   - [ ] Yes  
   - [x] No

9. This course will be:  
   a. required for students enrolled in the following degree programs(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.Eng., M.S., Ph.D., Materials Science and Engineering

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

11. [x] I verify that I have reviewed the FAQ for Export Control Basics for Distance Education *(http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education)*.

---

12. **Prefix**  
    MSEN  
    POLYMER LABORATORIES

<table>
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<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
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Approval recommended by:  

Alan Palazzolo *(MEEN)*  
Department Head or Program Chair  
*(Type Name & Sign)*  
Date: 7/1/14

John Criscione  
Chair, College Review Committee  
Date: 8/14/14

Miladin Radovic *(MEEN)*  
Department Head or Program Chair  
*(Type Name & Sign)*  
Date: 7/1/14

John Criscione  
Dean of College  
Date: 8/14/14

Karen Butler  
Chair, GC or UCC  
Date: 9/22/14

Submitted to Coordinating Board by:  

Associate Director, Curricular Services

---

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
## SYLLABUS

**MSEN 626/MEEN 606**  

**Polymer Laboratories**

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>H-J Sue</th>
</tr>
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<tbody>
<tr>
<td>TA:</td>
<td>Three postdocs/graduate students will serve as TA</td>
</tr>
<tr>
<td>Office:</td>
<td>ENPH 216</td>
</tr>
<tr>
<td>Office hours:</td>
<td>By appointment</td>
</tr>
<tr>
<td>E-mail address:</td>
<td><a href="mailto:hsue@tamu.edu">hsue@tamu.edu</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>(979) 845-5024</td>
</tr>
<tr>
<td>Class hours:</td>
<td>Monday 5:15 p.m. (or mutual agreements with the TAs) @ specified labs</td>
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<table>
<thead>
<tr>
<th>Textbook:</th>
<th>Handouts will be given a week before the lab sessions</th>
</tr>
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</table>
*Polymer: Polymer Characterization and Analysis*: Jacqueline L. Kroschwitz (editor)  
*Instrumental Methods of Analysis*, Hobart H. Willard, Lynne L. Merritt, Jr. and John A. Dean  
*Physical Properties of Polymers Handbook*, James E. Mark |

**Course Objective**  
To prepare students who are interested in polymer research with necessary experimental skills to conduct & analyze experimental work.

**Course Outline**  
This course covers basic experimental methods in polymer science. Broad spectra of experiments are planned, dealing with synthesis, characterization and structure/property relationship. Details and procedures for some of the experiments are given in Collins, Bares and Billmeyer (CBB). Others are described in handouts.

**Grade**

<table>
<thead>
<tr>
<th>Lab Performance: 15%</th>
<th>Grading System:</th>
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<tbody>
<tr>
<td>Report: 45%</td>
<td>Score of 80 and above: A</td>
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<tr>
<td>Presentation: 15%</td>
<td>Score of 65 – 79: B</td>
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<tr>
<td>Final Exam.: 25%</td>
<td>Score of 50 – 64: C</td>
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<tr>
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<td>Score of 49 and below: F</td>
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</table>
Learning outcomes
The students are expected to learn a total of 12 experimental skillsets with ability to carry out the experiments and analyze the results. The students are also expected to be able to write appropriate laboratory reports for each experiment. It is anticipated that the students will work in a team of four to gain team learning experiences. The overall learning from the class is expected to facilitate and accelerate the students' Ph.D. dissertation research related to polymer materials science.

Laboratory Experiments: (some changes may be made due to the equipment availability)
1. Polymerization of Styrene
2. Curing of epoxy (samples to be used for DMA & tensile tests)
3. Rubber swelling
4. Thermal Gravitational Analyzer
5. Density Measurements
6. Surface Roughness Measurements
7. Dynamic Mechanical Analysis
8. Fracture Toughness
9. Fourier Transform Infrared Spectroscopy
10. Scratch Test
11. Tensile Test
12. DSC

Lab. Report:
Each report should contain the following sections:

1. Introduction: This should be a brief (1-3 paragraphs) statement of the objectives of the experiment. The experimental method should be described, along with any pertinent theoretical background.

2. Experimental: This should contain a reference to the detailed procedure used; for example, CBB, pages 347-352, procedure II. This section should also include a complete sample calculation for one typical set of data.

3. (3) Results/Analysis: This should include a presentation of the experimental data, tabulated together with all calculated quantities. Where possible, appropriate graphs should be included.

4. Discussion/Conclusion: This section should include conclusions, unusual observations, and other remarks about the experiment. Alternate methods of synthesis, characterization or structure/property measurement should be discussed, along with the particular advantages and disadvantages of each.

5. Relevant Issues: These are questions that you must answer at the end of your report.

YOU MUST READ THE HAND-OUT OR THE EXPERIMENTAL DETAILS, AND THE THEORETICAL BACKGROUND FOR THE EXPERIMENT BEFORE YOU COME TO CLASS IN ORDER TO GAIN THE MOST BENEFIT FROM THE EXPERIMENT.
Students will work in groups of four. There will be three groups. Each student will write an individual report. It is expected that students will consult with each other, but the actual writing should be independent. The reports must be complete, but concise. Lengthy descriptions and discussions are unnecessary. Therefore, please keep the lab report to a total of five pages or less (excluding the title page). Reports are to be typewritten. Poor organization and/or sloppy presentation will result in a lower grade on the report. The lab report is due the week after the experiment is finished. For example, if you perform the styrene polymerization experiment on 9/6 the lab report is due on 9/13.

SCHEDULE OF CLASS (LECTURE AND EXPERIMENTS)

1st Day of Class will be announced and will focus on background and lab practices

(Subsequent class time will be finalized on that day)
2nd – 13th week: Laboratory Practice
14th week: Oral Presentation of Experiments

1. Polymerization of Polystyrene, PS (emulsion polymerization of Styrene)
   Read pages 337-341 in CBB

Relevant Issues:
1. How to determine the MW and MWD of the PS you have synthesized?
2. If air conditioning fails, will it affect your experiment? Why?

2. Curing of Epoxy
   Reagent list:
   Dow Epoxy Resin (DER 332): diglycidyl ether of bisphenol-A
   4,4'-Diaminodiphenyl sulfone (DDS).

   A. Preparation of the plates (mold)
   i. Clean the plates with acetone and a razor blade. (This procedure will be shown to you.)
   ii. Coat the plates with the mold release agent.
   iii. Place the plates and the rubber molder into the oven and heat the oven to 150°C. Leave the plates in the oven for 30 minutes.
   iv. Take the plates out of the oven (when the oven temperature reaches 100°C). Put in the rubber molder and the spacers and clamp the plates together. (You will be shown how to do this.) Put the plates (or mold) back in the oven.

   B. Preparation of epoxy
   i. Weigh out 60 grams of epoxy resin (DER 332) and the appropriate amount of DDS.
   ii. Heat the DER 332 to 130°C in the oven or on a hot plate. Take the DER 332 out of the oven and then mix the DDS into the DER 332 until you have a clear mixture.
III. Degas this mixture almost no gas bubbles are observed. DO NOT ALLOW THE SAMPLE TO GEL.
iv. Pour the solution in between the glass plates. (You can either do this when the plates are in the oven or you can take the plates out of the oven and pour the epoxy mixture in between the plates and then put them back into the oven.
v. Heat the sample to 180°C for 2 hours and then increase the temperature to 217°C for two hours.

Relevant Issues:
1. What will happen to the epoxy plaque mechanical properties if you accidentally put 5% more of curing agent in epoxy for curing?
2. Why the sample is heated to 180°C and then to 220°C for curing?

3. Rubber Swelling
_Materials needed: Two 2 gram pieces of vulcanized rubber (one with carbon black filler and one without)._

The experimental procedure is in CBB.

Relevant Issues:
1. If the rubber sample you use for the experiment contains a few small holes, will it affect the outcome of the results?
2. Which method, rubber swelling or DMA, is better for estimating $M_c$? Why?

4. TGA.
_Material being tested: Filled Polymers._
A small amount of samples will be given to you to carry out TGA experiments.

Relevant Issues:
1. What is an appropriate amount of samples to be used for the TGA experiment? Why?
2. Is it possible the weight of the sample will increase as temperature of testing is increased? Why?

5. Density Measurements.
_Material being tested: The Epoxy panel or the PS that was made at the beginning of the semester._

The density measurements will be obtained using a microbalance. You will need to cut off small samples (e.g. a $1/4'' \times 1/4'' \times 1/4''$ piece). The cutting procedure will be shown to you. The SOP will be explained to you and a hard copy is available as you perform the experiment.

Relevant Issues:
2. By what other means can you obtain density? Which method(s) will give you the best accuracy?
2. Is it possible to use the experiment to obtain density of a two-component polymer blend?

7. Dynamic Mechanical Testing  
Material needed: PP Sample

The standard operating procedure (SOP) will be explained to you, and there is a hard copy available as you perform the experiment.

Relevant Issues:  
1. Why there is usually a low temperature ten delta peak?  
2. What does the breadth of the T_g peak represent?  
3. What assumptions have to be made if the M_c (the molecular weight between crosslinks) of epoxies is to be measured using DMA?

7. Surface Roughness Measurements  
Material being tested: PP sample

Relevant Issues:  
1. What are the typical parameters used to describe surface roughness?  
2. Can the surface roughness value be changed if you change the magnification of the objective lens? Why?  
3. What are the instruments commonly used to measure surface roughness? Describe their resolution and usefulness and limitation.

8. Fracture Toughness Measurement (LEFM)  
Material being tested: Epoxy sample

Relevant Issues:  
1. What is plane strain condition? What is plane stress condition? Which is a material parameter? Why?  
2. If the polymer is very ductile and you still want to apply the LEFM approach, what can you do?  
3. Can you use LEFM on thin film polymers? Why?

9. Fourier Transform Infrared Spectroscopy (FTIR)  
Material being tested: PS or epoxy

Relevant Issues:  
1. Can FTIR detect functional group on nanoscale particles which are dispersed in a bulk sample?  
2. What type(s) of chemical structures cannot be detected using FTIR?  
3. If your sample contains water, is it possible to quantify their amount using FTIR? How?

10. Scratch Tests
Material being tested: Polypropylene

Relevant Issues:
1. What are the limitations of a spherical tip for scratch testing?
2. Can the scratch visibility resistance be objectively evaluated if the specimens possess different colors?
3. Will ductile material or brittle material show better resistance to scratch visibility? Why?
4. Can the scratch tests be applied to study coating adhesion? How?

11. Tensile Test

Material being tested: PP samples

Relevant Issues:
1. How do you make sure that the Young’s modulus measured is correct? How is Secant Modulus determined?
2. How to obtain a true stress and true strain curve?
3. What is the difference between toughness and ductility?

12. Thermal analysis (DSC)
Material being tested: PP

Thermal analysis will be performed using Differential Scanning Calorimetry (DSC). DSC will be performed on your PP sample.

Relevant Issues:
1. Why the T_g determined by DMA is different from that by DSC? Which is more accurate?
2. How does the scanning rate affect the data?
3. How do you estimate lamellar thickness using a DSC?
4. How do you estimate the percent crystallinity using DSC?

- Attendance and Make-up Policies
Attendance and make-up of exams will be in accordance with Student Rule 7 (http://studentrules.tamu.edu/rule07).

Make-up Policy:
If an absence is excused, the instructor will either provide the student an opportunity to make up any quiz, exam or other work that contributes to the final grade or provide a satisfactory alternative by a date agreed upon by the student and instructor. If the instructor has a regularly scheduled make up exam, students are expected to attend unless they have a university approved excuse. The make-up work must be completed in a timeframe not to exceed 30 calendar days from the last day of the initial absence.

The reasons absences are considered excused by the university are listed below. See Student Rule 7 for details (http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does
not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

1) Participation in an activity that is required for a class and appears on the university authorized activity list at https://studentactivities.tamu.edu/app/sponsauth/index
2) Death or major illness in a student’s immediate family.
3) Illness of a dependent family member.
4) Participation in legal proceedings or administrative procedures that require a student’s presence.
5) Religious holy day. NOTE: Prior notification is NOT required.
6) Injury or illness that is too severe or contagious for the student to attend class.
   a) Injury or illness of three or more class days:
      Student will provide a medical confirmation note from his or her medical provider within one week of the last date of the absence (see Student Rules 7.1.6.1)
   b) Injury or illness of less than three class days:
      Student will provide one or both of these (at instructor’s discretion), within one week of the last date of the absence:
      (i.) Texas A&M University Explanatory Statement for Absence from Class form available at http://attendance.tamu.edu
      or (ii.) Confirmation of visit to a health care professional affirming date and time of visit.
7) Required participation in military duties.
8) Mandatory admission interviews for professional or graduate school that cannot be rescheduled. Other absences may be excused at the discretion of the instructor with prior notification and proper documentation. In cases where prior notification is not feasible (e.g., accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class.

- **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. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu).

- **Academic Integrity Statement and Policy**
  “An Aggie does not lie, cheat or steal, or tolerate those who do.”
  [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
- Submit original form and attach a course syllabus.

Form Instructions
1. Course request type:
   □ Undergraduate  □ Graduate  □ First Professional (e.g., DVM, JD, MD, etc.)
2. Request submitted by (Department or Program Name):
   Department of Sociology
   SOCI 640 SOCIOLOGY OF DEVELOPMENT
3. Course prefix, number and complete title of course:

4. Catalog course description (not to exceed 50 words):
   Survey of sociology of development; review of major classical and contemporary approaches to development including but not limited to modernization theory, world systems theory, comparative nationalism, demographic theories, feminist approaches; Contradictions of development including K-Cycles, social movements and ecological constraints.

5. Prerequisite(s): Graduate Status or permission of instructor
   Cross-listed with: ____________________________  Stacked with: ____________________________
   Cross-listed courses require the signature of both department heads.

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

7. 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

8. Will this course be submitted to the Core Curriculum Council?
   □ Yes   □ No

9. This course will be:
   a. required for students enrolled in the following degree programs(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 sociology)

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

11. ☑ I verify that I have reviewed the FAQ for Export Control Basics for Distance Education (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).

12. Prefix  Course #  Title (excluding punctuation)

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Approval recommended by:

Jane Sell  7/14/2014
Department Head or Program Chair (Type Name & Sign)
Date

Patricia A. Hurley  7/14/2014
Chair, College Review Committee
Date

Pamela R. Matthews
Dean of College
Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services
Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 04/14
SOCIOLOGY 640

SOCIOLOGY OF DEVELOPMENT

PROFESSOR SAMUEL COHN

T 9-12
Academic 307

Office: 417 Academic
Office Phone: 845-0814
Home Phone: (512) 454-8802

OFFICE HOURS

T 12-3

COURSE OVERVIEW

This is an introduction to the sociology of economic development. Development sociology is a highly diverse field with practitioners using every theoretical perspective from world systems theory to neo-Marxism to functionalism to demographic theory to organizational institutionalism to feminist theory to critical race theory to neoclassical economics. It operates at the macro and the micro level. This course provides a broad introduction to many of these perspectives—with some emphasis on economic sociological theory and the tension between state and market.

GRADING AND EVALUATION

The grades for the course will be based 50% on a set of ten 100-250 word themed papers (each graded on a scale from 0 to 10) and 50% on a take home final essay exam which is worth 100 points (graded on a scale from 0 to 100).

The papers will be assigned one a week and will be on fixed topics to be announced at the end of each class. Because there are more than ten weeks in the semester—more than ten topics will be given. Students may either ignore the extra assignments or submit more than ten papers and have the best ten count for the grade.
The final exam will be a 24 hour take home exam. There will be four questions – answer four of four. The exam is open book, open internet and solo. No verbal or written consultation, email help or other uses of living human beings other than the professor are allowed. The exact time of the exam will be set to maximize the convenience of the students in the class.

A = 180 points or more  
B = 160 to 179 points  
C= 140 to 159 points  
D = 120 to 139 points  
F= Lower than 120 points

**ATTENDANCE AND MAKE-UP POLICY**

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."

Generally papers are due at the beginning of class the week after they are assigned – and the final exam is given on a date jointly agreed upon by the students. Turning papers after the required date is acceptable only with a university excused absence.

Note you do not have to write a paper every week. More papers are assigned than are necessary to make a student’s quota of ten. So students are best off skipping assignments on weeks where they have lots of other demands on their time – and then concentrate on turning in good papers in a timely manner on the weeks they are “on duty”.
Where to Find the Readings:

Most of the readings can be found in the TAMU closed reserves. Articles and book selections will be on electronic reserve. Whole books will be kept on physical reserve.

All the books will be available on closed reserve. However, you may want to buy the books from which we read large amounts – to facilitate reading at times and locations that are more suitable to your personal schedule.

In particular, we will be making nearly constant use of the Szirmai – so if you buy only one book that is an excellent choice. Buying the book by Cohn gets me royalties (ka-ching!) but is otherwise no more or less desirable than buying the other non-Szirmai books on the list. Buy as many or as few books as your taste and budget allows.

Suggested Books for Purchase:


**AGGIE HONOR STATEMENT**

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

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: http://aggiehonor.tamu.edu

**ADA 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. For additional information visit http://disability.tamu.edu.

**COURSE OUTLINE AND READING ASSIGNMENTS**


- Chapter 3. Pp. 68-72, 78-90
- Chapter 4. Pp. 117-128
- Chapter 9. Pp. 303-353
Week 2. Functionalism and Modernization Theory // Classical Dependency Theory


   Chapters 1-2. Pp. 21-148
   Chapter 4. Pp. 191-224

Week 3. World Systems Theory // Historcist Models of Stable World System Structures


   Chapter 1. Pp. 1-34


   (Note the reading starts halfway through Chapter 1)


   Chapter 2. Pp. 19-45
   Chapter 4. Pp. 76-106
Week 5. The Developmentalist State


Week 6. The Classic O’Connorian Model of Development Within the Core


Week 7. Applications of O’Connorian Models to Underdeveloped Economies


Chapters 1-7. Pp. 1-125
Chapters 11-12. Pp. 165-190

Week 8. Social Democratic Models of Development


Selections TBA.


Week 9. The Resource Curse Debate // Kondratieff Cycles


Chapter 11. Pp. 269-83 ONLY.
Week 10. Education and Development // Demographic Models of Development

Szirmai, Chapter 5. 141-176

Szirmai, Chapter 7. Pp. 213-254


Week 11. Gender and Development


Fernandez-Kelly, Maria Patricia. 1983. For We Are Sold, I and My People: Women and Industry in Mexico’s Frontier. Albany, SUNY.

Chapter 4. Pp. 70-90.

Week 12. Post-Development Critique // Environment and Development


Chapter 1. Pp. 15-44


Week 13. The Moore Commodity Centered Model of Limits to Growth//Criminological Models of Development


Week 14. Development and Social Conflict


Chapter 1. Pp 1-4, 9-40


Chapter 2. Pp. 35-76.
Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional

1. Request submitted by (Department or Program Name): Educational Psychology

2. Course prefix, number and complete title of course: SPED 603: Foundations of Special Education

3. Catalog course description (not to exceed 50 words): Build a knowledge base to understand the historical and conceptual foundations of special education; familiarization with special education literature; provide an overview of current issues and trends impacting special education.

4. Prerequisite(s): Graduate Classification; Approval of Instructor; Approval of Department Head

Cross-listed with:

Stacked with:

Cross-listed courses require the signature of both department heads.

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

   Ph.D students in Educational Psychology - Special Education emphasis

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

   Ph.D. in School Psychology

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

9. Prefix: SPED
    Course #: 603
    Title (excluding punctuation): Foundations of Special Education

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Approval recommended by:
Victor Wilson, Ph.D.
Department Head or Program Chair (Type Name & Sign) Date

Department Head or Program Chair (Type Name & Sign) Date
(if cross-listed course)

Submitted to Coordinating Board by:
Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 3/10
SPED 603

Foundations of Special Education:
Spring 2014

Class meetings: Thursday: 12:00-3:00
Room: TBA

Instructor: Mack D. Burke, Ph.D. mburke@tamu.edu
Associate Professor of Special Education
Department of Educational Psychology
648 Harrington Tower

Office Hours: By appointment*

*Students are encouraged to seek feedback and clarification as needed through out-of-class meetings and email communications. Please schedule meetings in advance. In general, email is the most efficient and swift means of communication for questions/clarifications as well as arranging a meeting time.

Required Text:


Readings: Articles and Websites that will be used during the course will be posed in e-learning.

Prerequisites: Graduate classification; Approval of Instructor; Approval of Department Head.

Description: The primary purposes of this course are to: (a) build a knowledge base for understanding the historical and conceptual foundations of special education, (b) to familiarize students with foundational special education literature, and (c) provide an overview of the current issues and trends impacting the field of special education. The course will focus on "where we have been," "where we are," and "where we are going." Content will be covered to address breadth across disability domains as well as depth in several domain specific areas related to foundational principles of special education.

Attendance Policy: Students are required to attend class all class sessions on time. For university excused absences, you should submit class work as assigned by the instructor by 30 days from the absence or make alternate arrangements with the instructor. See http://student-rules.tamu.edu/rule07 for university policy.

Course Objectives:
1. Students will demonstrate mastery of foundational principles of special education related to history, pedagogy, and research.
2. Students will analyze and evaluate key foundational articles in special education.
3. Students will be able to identify the important figures that made a substantial impact on the field of special education.
4. Students will demonstrate mastery of contemporary issues and trends in special education.

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<td><strong>Class Preparation and Participation:</strong> Come to all class meetings thoroughly prepared, having completed assignments sufficiently to (a) <strong>engage in discussions about assigned readings</strong> and (b) relate their contents to previous class assignments and discussions. The guest speakers may assign additional articles to be read prior to those presentations.</td>
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<td><strong>Assigned Class Chapters:</strong> Thoroughly read weekly assigned chapters and be <strong>prepared to lead the discussion with the class of your assigned reading.</strong> Students will be assigned should (a) be well-prepared to assume their respective role in facilitating discussion for assigned readings and (b) submit the corresponding written content required by ahead of time.</td>
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<td><strong>Issues Paper:</strong> Select a categorical area being served in special education that represents an area of focus. Prepare a paper (no more than 15 double spaced pages, not including title page, references, tables, and figures) that addresses a critical issue in an area of interest.</td>
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<td><strong>Presentation:</strong> Prepare and deliver a 15-20 minute presentation that summarizes your topical paper. Presentations should be professionally prepared and utilize Microsoft Powerpoint.</td>
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<td><strong>Midterm:</strong> Midterm will be on first half of content discussed and will consist of short answer and essay questions.</td>
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<tr>
<td><strong>Final:</strong> Final will be on second half of content discussed and will consist of short answer and essay questions.</td>
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**Course Evaluation:** Percentage of grade breakdown:

- **Preparation** (i.e., Chapter Critiques), Leading Discussion, and Participation: 20%
- **Midterm:** 50 points (25%)
- **Final:** 100 points (30%)
- **Issues Paper:** 50 points (15%)
- **Presentation:** 20 points (10%)
Grading Criteria
Your final grade will be based on a percentage and will be earned based on the following distribution:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60

AMERICANS WITH DISABILITIES ACT
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 accommodation, contact the Office of Support Services for Students with Disabilities in Room B118 of Cain Hall, or call (979) 845-1637. Helpful information is located at http://disability.tamu.edu.

SCHOLASTIC DISHonesty
As commonly defined, plagiarism consists of passing off the ideas, words, writings, etc., which belong to another as one’s own. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the current issue of the Texas A&M University Student Rules, under the section, “Scholastic Dishonesty.”

AGGIE HONOR CODE
"An Aggie does not lie, cheat, or steal or tolerate those who do." Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. On all course work, assignments, or examinations at Texas A&M University, the following Honor Pledge shall be pre-printed and signed by the student: "On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work." For additional information please visit: http://aggiehonor.tamu.edu.

RESPECT
The faculty of the College of Education and Human Development (CEHD) value and respect diversity and the uniqueness of each individual. The faculty affirms its dedication to non-discrimination in our teaching, programs, and services on the basis of race, color, religion, gender, age, sexual orientation, domestic partner status, ethnic or national origin, veteran status, or disability. The CEHD at Texas A & M University is an open and affirming organization that does not tolerate discrimination, vandalism, violence or hate crimes. We insist that appropriate action be taken against those who perpetrate such acts. Further, the College is committed to protecting the welfare, rights, and privileges of anyone who is a target of prejudice or bigotry. Our commitment to tolerance, respect, and action to promote and enforce these values embraces the entire university community. In the spirit of shared responsibility, each University unit, student organization, and community member is
encouraged to help make our campus, and this class, a welcoming place for all. Should you have any concerns related to respect for diversity or feel that you (or any others) are being discriminated against, please contact your departmental Ombudsperson, the Department Head, or the College Ombudsperson.

Class Article Responses
Summary of Reading Discussion Group Roles

(REQUIRED) ROLE: BIG IDEA IDENTIFIER
Your job is to summarize or paraphrase the BIG IDEAS from each reading. This should take the form of 3-5 statements from each reading that "sum up" the reading assignment.

(REQUIRED) ROLE: QUESTION BUILDER FOR DISCUSSION
Your job is to develop a list of questions from each reading that the group can discuss that will help them understand the main points of the assigned reading(s). Don't worry about the small details. The task is to help people talk over the big ideas in the reading and to share reactions to the text. [Be prepared with your own brief answers to your questions.]

(REQUIRED) ROLE: PASSAGE MASTER
Your job is to locate a few special passages or direct quotes that are important in the reading assignment. These may provide key information, back up the information given, or summarize the author's key points. They might also be passages that strike your fancy for some reason, are particularly well written, or might be controversial or contradictory with other passages or other information learned in class. You may read passages aloud, ask others to read them, or have the circle read them silently and then discuss them.

(OPTIONAL) ROLE: GRAPHIC ORGANIZER
Your job is to construct a concept map or flow chart that visualizes how the ideas, concepts, or arguments are presented and related to each other from the reading(s), previous discussions, or between the articles. You can download a trial copy of Inspiration, or use word shapes to develop the graphic organizer.

(OPTIONAL) ROLE: ARGUMENT ANALYZER
Your job is to identify the main arguments in the article and make them explicit. Extract the main arguments from the text. The sometimes be identified from a thesis statement, purpose statement, or position the author is attempting to make.

(OPTIONAL) ROLE: VOCABULARY BUILDER/BUZZWORD BINGO/JARGON COLLECTOR
"Whoever Owns the Language Owns the Conversation." Your job is to develop a list of key words and concepts that are important to the understanding of the reading. You need to write down the definitions or a brief explanation of the words and concepts which you select from the reading.
ROLE: NOTE TAKER, QUESTION COLLECTOR, AND PROCESS CHECKER
You don’t need to come to class with a prep sheet since your task is performed during the class session. Your job is two-fold. First, during the discussion you are to (a) take notes on the discussion that will be distributed to the group, (b) generate a list of additional questions, perhaps those you might like for the instructor or some other person in class to address that arise from the discussion, and (c) identify to whom the question might be addressed (other students or the instructor). You are to review the group process for the class session with the group and identify highlights or problems in the group’s work. E.g., what worked in this session—and what could be improved and how?

AGENDA

Readings from the Handbook of Special Education

I. Historical and Contemporary Issues in Educating Exceptional Learners, Section Editor, James M. Kauffman, University of Virginia

Introduction

1. A History of Special Education, Michael M. Gerber


5. Special Education and Teacher Preparation, Margo Mastropieri, Tom Scruggs, & Sara Mills

II. Legal Aspects of Special Education, Section Editor, Mitchell L. Yell, University of South Carolina

Introduction

6. The Individuals with Disabilities Education Act: The Evolution of Special Education Law, Mitchell L. Yell, Antonis Katysiannis, & M. Renee Bradley

7. Free Appropriate Public Education, Mitchell L. Yell & Jean B. Crockett

8. Individualized Education Programs for Children with Disabilities, Barbara D. Bateman
9. Least Restrictive Environment, Michael Rozalski, Jason Miller, & Angie Stewart

III. The General Education Context of Special Education, Section Editor, Naomi P. Zigmond, University of Pittsburgh

Introduction

10. Responsiveness to Intervention Models for Reducing Reading Difficulties and Identifying Learning Disability, Rollanda E. O’Connor & Victoria Sanchez

11. Standards-Based Reforms and Students with Disabilities, Martha L. Thurlow & Rachel F. Quenemoen


13. General and Special Education Are (and Should Be) Different, Naomi Zigmond & Amanda Kloo

IV. Categorical Issues in Special Education, Section Editors, Daniel P. Hallahan & Paige C. Pullen, University of Virginia

Introduction


15. Learning Disabilities, Paige C. Pullen, Holly B. Lane, Kristen E. Ashworth, & Shelly P. Lovelace

16. Attention-Deficit/Hyperactivity Disorder, Karen J. Rooney

17. Emotional and Behavioral Disorders, Timothy J. Landrum

18. Communication Disorders, Filip Loncke

19. Deaf and Hard of Hearing Students, Jean F. Andrews, Pamela C. Shaw, & Gabriel Lomas

20. Blind and Low Vision, George J. Zimmerman & Kim Zebehazy


23. Multiple and Severe Disabilities, Susan Bruce

24. Special Gifts and Talents, Carolyn M. Callahan

V. Assessment of Students with Disabilities, Section Editor, Jennifer H. Lindstrom, University of Georgia
Introduction

25. High-Stakes Testing and Accommodations, Jennifer H. Lindstrom


VI. Policy and Administration of Special Education, Section Editor, Jean B. Crockett, University of Florida

Introduction

27. Conceptual Models for Leading and Administrating Special Education, Jean B. Crockett

28. Fiscal Policy and Funding for Special Education, Tom Parrish & Jenifer Harr-Robins

29. Using Professional Standards to Inform Leadership in Special Education, Mary Lynn Boscardin

30. Factors Influencing Special Education Teacher Quality and Effectiveness, Bonnie S. Billingsley

VII. Instructional Issues for Students with High Incidence Cognitive Disabilities, Section Editor, John W. Lloyd, University of Virginia

Introduction

31. Reading, Paige C. Pullen & Deanna B. Cash

32. Writing and Students with Disabilities, Steve Graham & Karen R. Harris

33. The Development of Arithmetic and Word-Problem Skill Among Students with Mathematics Disability, Lynn S. Fuchs, Sarah R. Powell, Pamela M. Seethaler, Paul T. Cirino, Jack M. Fletcher, Douglas Fuchs, & Carol L. Hamlett

34. Science and Social Studies, Tom Scruggs, Margo Mastroperci, & Lisa Marshak

35. Physical Education, Luke E. Kelly & Martin C. Block

36. Career and Technical Education, Maureen A. Schloss & Philip L. Gunter

37. Technology and Academic Instruction Considerations for Students with High-Incidence Cognitive Disabilities, Cheryl A. Wissick & J. Emmet Gardner

VIII. Instructional Issues for Students with Low Incidence Cognitive Disabilities, Section Editor, Adelle Renzaglia, University of Illinois

Introduction

38. Educating Students with Significant Cognitive Disabilities: Historical Overview and Future Projections, Fred Spooner & Fredda Brown
39. Systematic Instruction of Students with Severe Disabilities, Erik Drasgow, Mark Wolery, James Halle, & Zahra Hajiaghamohseni

40. Instructional Contexts, John McDonnell

41. Access to General Education Curriculum for Students with Significant Cognitive Disabilities, Mike L. Wehmeyer

42. Preparing Students with Significant Cognitive Disabilities for Life Skills, Stacy K. Dymond

IX. Transition of Adults with High Incidence Disabilities, Section Editor, David J. Scanlon, Boston College

Introduction

43. Transition to Post Secondary Education, Joseph W. Madaus & Manju Banerjee

44. Choice Patterns and Behaviors of Work-Bound Youth with High Incidence Disabilities, Jay W. Rojewski & Noel Gregg

45. Transition to Independent Living, David Scanlon, Jim Patton, & Marshall Raskind

X. Transition of Adults with Low Incidence Disabilities, Section Editor, M. Sherril Moon, University of Maryland

Introduction

46. Preparing Students with Low Incidence Disabilities to Work in the Community, Katherine J. Inge & M. Sherril Moon

47. Preparing Students with Low-Incidence Disabilities for Community Living Opportunities, Jane M. Everson & Meghan H. Trowbridge

XI. Parent and Family Issues in Special Education, Section Editor, George H. S. Singer, University of California at Santa Barbara

Introduction


49. Resilience in Families of Children with Disabilities: Risk and Protective Factors, George Singer, Christine Maul, Mian Wang, & Brandy Ethridge

50. Promoting Family Outcomes in Early Intervention, Don B. Bailey, Jr., Melissa Raspa, Betsy P. Humphreys, & Ann M. Sam

XII. Early Identification and Intervention in Exceptionality, Section Editor, Maureen A. Conroy, Virginia Commonwealth University
Introduction

51. Advances in Theory, Assessment and Intervention with Infants and Toddlers with Disabilities, Carl J. Dunst


53. Frameworks for Guiding Program Focus and Practices in Early Intervention, Patricia A. Snyder, Tara W. McLaughlin, & Maria K. Denney

54. Early Identification and Intervention in Gifted Education: Developing Talent in Diverse Learners, Catherine M. Brighton & Jane M. Jarvis

XIII. Cultural and International Issues in Special Education, Section Editor, Dimitris Anastasiou, University of Western Macedonia

Introduction

55. Ethnicity and Exceptionality, Dimitris Anastasiou, Ralph Gardner, III, & Domna Michail

56. Gender and Exceptionality, Martha J. Coutinho & Donald P. Oswald

57. International Differences in Provision for Exceptional Learners, Dimitris Anastasiou & Clayton Keller

XIV: Class Presentations

*NOTE: This schedule is subject to change based on guest speaker availability and based on the collective needs of the class. A revised agenda will be posted ahead of time.
Important information from the Registers Office:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2</td>
<td>Wednesday. Graduation application opens for all students planning to</td>
</tr>
<tr>
<td></td>
<td>graduate in May 2013.</td>
</tr>
<tr>
<td>January 11</td>
<td>Friday, 5 p.m. Last day to register for spring semester classes. Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td>January 14</td>
<td>Monday. First day of spring semester classes.</td>
</tr>
<tr>
<td>January 18</td>
<td>Friday, 5 p.m. Last day for adding/dropping courses for the spring semester.</td>
</tr>
<tr>
<td>January 21</td>
<td>Monday. Martin Luther King, Jr. Day. Faculty and Staff holiday.</td>
</tr>
<tr>
<td>February 15</td>
<td>Friday. Last day to apply for all degrees to be awarded in May without a late fee.</td>
</tr>
<tr>
<td>March 4</td>
<td>Monday. noon. Mid-semester grades due.</td>
</tr>
<tr>
<td>March 11-15</td>
<td>Monday-Friday. Spring Break.</td>
</tr>
<tr>
<td>March 15</td>
<td>Friday. Faculty and Staff holiday.</td>
</tr>
<tr>
<td>March 29</td>
<td>Friday. Reading day, no classes.</td>
</tr>
<tr>
<td>April 2</td>
<td>Tuesday, 5 p.m.</td>
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<td></td>
<td>· Last day for all students to drop courses with no penalty (Q-drop).</td>
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<td></td>
<td>· Last day to change Kinesiology 198/199 grade type.</td>
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<tr>
<td></td>
<td>· Last day to officially withdraw from the University.</td>
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<tr>
<td>April 11-26</td>
<td>Thursday-Friday. Preregistration for the 2013 summer and fall semesters.</td>
</tr>
<tr>
<td>April 21</td>
<td>Sunday. Muster. Campus ceremony.</td>
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<tr>
<td>April 29</td>
<td>Monday. Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.</td>
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<tr>
<td>April 30</td>
<td>Tuesday.</td>
</tr>
<tr>
<td></td>
<td>· Last day of spring semester classes.</td>
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<tr>
<td></td>
<td>· Last day to apply for all degrees to be awarded in May.</td>
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<tr>
<td></td>
<td>· Redefined day, students attend their Friday classes.</td>
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<tr>
<td></td>
<td>· Prep day, classes meet. No regular course exams (except for laboratory and one-hour classes) shall be given on these days.</td>
</tr>
<tr>
<td>May 1-2</td>
<td>Wednesday-Thursday. Reading days, no classes.</td>
</tr>
<tr>
<td>May 3, 6-8</td>
<td>Friday, Monday-Wednesday. Spring semester final examinations for all students.</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
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<tr>
<td>May 9</td>
<td>Thursday. 6 p.m. Grades for degree candidates due.</td>
</tr>
<tr>
<td>May 10</td>
<td>Friday. 5 p.m. Last day for May undergraduate degree candidates to apply for Tuition Rebate.</td>
</tr>
<tr>
<td>May 10-11</td>
<td>Friday-Saturday. Commencement and Commissioning.</td>
</tr>
<tr>
<td>May 13</td>
<td>Monday. noon. Final grades for all students due.</td>
</tr>
</tbody>
</table>

* All dates and times are subject to change.