The University Of Toledo

NEW COURSE PROPOSAL

Level (check one)
Undergraduate
(•) Graduate

Will this course impact program requirements? [ ] If yes, a Program Modification must be completed.

Type of course (check all that apply):
[ ] Academic Skills Enhancement [ ] Writing Intensive (WAC) [ ] honors
[ ] Univ. Core: *English* *Hum* *Math* *Nat.Sciences* *Social Sciences*
Multicultural: *Diversity of US Culture* *Non-US Culture*
[ ] Transfer module: *Arts&Hum* *Engl* *Math* *Nat Sci & Phys* *Soc Sci*
(to be considered as core curriculum, question 18 must be completed)

1. College: ENG
   Department:
2. Contact Person: Wm. Ted Evans Phone: 530-3349 Email: william.evans@utoledo.edu
3. Alpha/Numeric Code (Subject area - number): GNEN 6100
4. Proposed title:
   Engineering Materials Science and Applications
   Proposed effective term:
5. Planned enrollment per section: 15 per term: 15
6. Is the course cross-listed with another academic unit? [✓] Yes [ ] No
   Is the course offered at more than one level? [ ] Yes [✓] No
   If yes to either question, please list additional Alpha/Numberic codes, and submit a separate New Course form or Course Modification form for the course(s) referenced below.
   a. CHEE - 6100 b. M Zyung c.
   Approval of other academic unit (signature)
   Name and title G Lipscomb Prof
   If course is to be offered at more than one level, attatch an explanation of the different requirements that students must meet for each level. If the requirements are the same for each level, justification must be provided.
7. *Credit hours: Fixed:* 3 or Variable: to
8. Delivery Mode:

	Primary	Secondary	Tertiary
a. Activity Type*	Other - DL	Lecture	
b. Minimum Credit Hours	3		
Maximum Credit Hours	3		
c. Weekly Contact Hours	3		

*Choices are: Lecture, Recitation, Seminar, Regular Lab, Open Lab, Studio, Clinic, Field, Independent Study, Workshop, Computer Assisted Instruction, Other

9. Terms offered: [ ] Fall [✓] Spring [ ] Summer
   Years offered: (•) Every Year Alternate Years
10. Are students permitted to register for more than one section during a term? (•) No Yes
    May the courses be repeated for credit? (•) No Yes Maximum Hours
11. Grading System:

Undergraduate	Gradute
Normal Grading (A-F,PS/NC.PR, I)	(•) Normal Grading (A-F,PS/NC.PR, I)
Passing Grade/No Credit (A-C, NC)	Grade Only (A-F)
Credit/No Credit	Satisfactory/Unsatisfactory (G only)

FEB 16 2012

Administrative Use Only
Code:
Approved (senate or Grad Council)
Effective Date: / / (mm/dd/yyyy)
CIP Code:
Sub: Prog: Level:

Grade Only (A-F, PR, I)	Audit only
Audit only	No Grade
No Grade	

12. Prerequisites (must be taken before): a. - b. - c. -

PIN (Permisson From Instructor) PDP (Permission From Department)

Co-requisites (must be taken together): a. - b. - c. -

13. If course is to replace an existing, course(s) will be deleted, and when should that deletion occur?

	Course to be removed from inventory	Final Term to be offered (YYYYT, i.e. use 20064 for Fall'06)
a.		
b.		
c.		
d.		

14. Catalog description (30 words Maximum)

Study of engineering materials science and applications relevant for industry and manufacturing. Course content emphasizes the relation of structure and processing to design and applications of metallic, semiconductor, ceramic polymeric and composite mat

15. Attach a copy of a complete outline of the major topics covered. (Providing a syllabus that includes this information is acceptable.)

Syllabus: See Attached — Click here to view the Syllabus

Attachment 1 — No Attachment

Attachment 2 — No Attachment

16. Where does this course fit in the University/College/Department curriculum? (Be specific by course level, if applicable). Indicate prospective demand.

GNEN 6100 is an elective course in the MSE program of study.

17. If the proposed course is similar to another course in the College or University, please describe the difference and provide a rationale for the duplication. (If this course duplicates material covered in another course within your department or college or in another college, attach a letter of endorsement from that area's dean and department chairperson indicating their support. Clarify the maner in which this course will differ).

This Course is applications based and, as such, does not duplicate another course.

18. If the course is intended to meet a University Undergraduate Core requirement, complete the following and submit a course syllabus using the *template*:

Please explain how this course fulfills the general education guidelines. (*Guidelines* are available in *Faculty Senate Website*)

Course Approval:

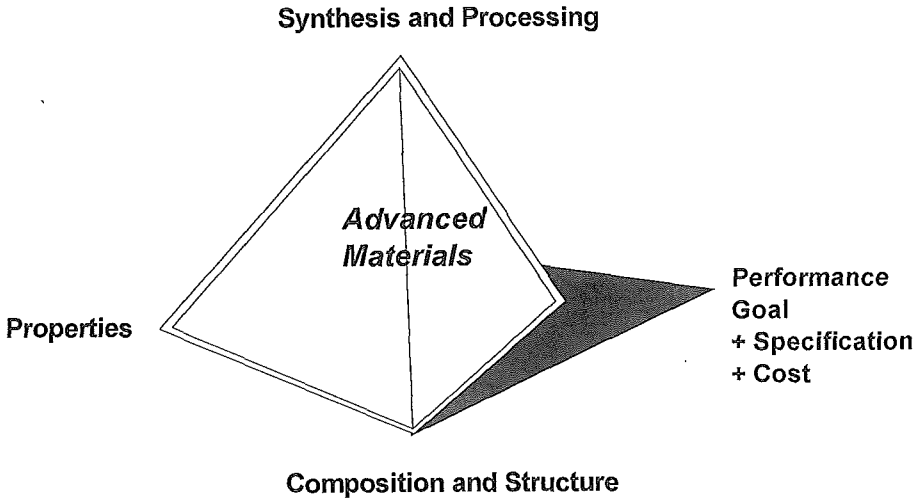
Department Curriculum Authority:	William P Evans	Date 2/9/2012 (mm/dd/yyyy)
Department Chairperson:		Date / / (mm/dd/yyyy)
College Curriculum Authority:	Patricia A Reid	Date 2/21/2012 (mm/dd/yyyy)
College Dean:	Edward Sam [illegible]	Date 2/21/2012 (mm/dd/yyyy)

Display New Course Infomation

After college approval, submit the original signed form to the Faculty Senate (UH 3320) for undergraduate-level courses; for graduate-level courses submit the original signed form to the Graduate School (UH3240). For undergraduate/graduate dual-level courses, submit the proposals to each office.

Faculty Senate Undergrad. Curriculum Comm.:		Date / / (mm/dd/yyyy)
Faculty Senate Core Curriculum Comm :		Date / / (mm/dd/yyyy)
Graduate Council :		Date 3 / 20 / 2012 (mm/dd/yyyy)
Office of the Provost :		Date / / (mm/dd/yyyy)
Registrar's Office:		Date / / (mm/dd/yyyy)

GNEN 6100 Syllabus Spring Semester 2012
Engineering Materials Science and Applications



1. COURSE DESCRIPTION

Engineering Materials Science and Applications
[3 hours] Study of engineering materials science and applications relevant for industry and manufacturing. Course content emphasizes the relation of structure and processing to design and applications of metallic, semiconductor, ceramic, polymeric and composite materials.
Prerequisite: Graduate standing

2. COURSE INSTRUCTOR

Dr. John P. Dismukes
Professor, Chemical and Environmental Engineering Dept.
3064 Nitschke Hall, MS 305, The University of Toledo, Toledo, OH 43606-3390
John.Dismukes@utoledo.edu; **Tel: 419-530-8065**

3. ELECTRONIC COURSE MATERIALS AND ASSIGNMENTS

Student will access course materials by logging electronically into the DL Electronic Link: www.dl.utoledo.edu/BB9/UTAD and then into the GNEN6100 Course:

- Student Welcome Letter, Instructor Background, Course Syllabus and Schedule
- 14 Weekly Homework Assignments, 1 Nanotechnology Project, 1 Final Exam
- Supplementary Viewgraphs and Textbook URL Addressing Course Topics

Student will submit assignment solutions to instructor via internal blackboard email, with additional communication as necessary to instructor

- Via UT email at John.Dismukes@utoledo.edu
- Via UT phone at 419-530-8065 (leave message if no answer)
- Via Instructor Cell Phone 419-283-8780 Per Scheduled Discussion

4. COURSE OBJECTIVE

Materials science and engineering has experienced rapid growth since the 1960's as a broad, highly multidisciplinary field that integrates concepts and practices from many engineering disciplines (e.g. chemical, mechanical, metallurgical, ceramic, electrical and polymeric). The goal of the course is to provide practicing engineers, typically employed in industrial and governmental organizations, with a fundamental understanding of materials science and engineering principles as a basis for selecting, tailoring and controlling materials properties and behavior in their work environment. As illustrated conceptually in the "**Advanced Materials**" figure above, this involves understanding and controlling the **four basic interrelated aspects of materials science behavior** encompassing a) composition and structure, b) synthesis and processing, c) properties and d) performance in applications.

5. OVERVIEW of COURSE CONTENT

This 1-semester 3 credit hour course will be taught as a key elective targeted for graduate students enrolled in the University of Toledo "***Masters of Science in Engineering Program***". Instruction will be presented via sixteen weekly instruction sessions in the standard University of Toledo distance learning mode, **using Blackboard as the key instructional vehicle**. Additional instructor-student contact includes phone, email, and meetings if required.

The textbook and supplementary materials available electronically will address fundamentals and applications of materials science and engineering in the modern world. A further key component of the course will be the practical demonstration of the course principles via a ***Nanotechnology Project Report*** assessing a technical article on nanomaterials of current interest to the student in 21st Century work environment. Examples of nanomaterials articles, an article on materials selection, and instructions for the report format are provided on the GNEN6100-001 Blackboard site (www.dl.utoledo.edu). ***The specific project topic will be selected by each student, with the instructor approval during Week 8, and final report submission during Week 15.***

4. TEXTBOOK

The 17-chapter textbook, ***Foundations of Materials Science and Engineering – 5th Edition, by William F. Smith and Javad Hashemi, McGraw-Hill, ISBN 978-0-07-352924-0, 2010*** , supplemented by additional McGraw-Hill instructional aids available electronically at

- http://www.mhhe.com/smithmaterials

covers the following fundamental and applied materials science topics:

- Introduction to Materials Science and Engineering
- Atomic Structure and Bonding
- Thermally Activated Processes and Diffusion in Solids
- Key Materials Properties and Behavior
    - Mechanical, Corrosion, Electrical, Optical, Magnetic, Biological

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5. WEEKLY COURSE SCHEDULE and ASSIGNMENTS

The 17-week course schedule, shown below, will include reading of specified Text Chapters, supplemented by weekly viewgraphs available on Blackboard. Sample nanomaterials technical articles, a materials design article, and instruction for executing the Nanotechnology Project Report are also provided on Blackboard.

Assignments include submission of:

- 14 weekly homework problem sets (Weeks 1-8 and Weeks 10-15)
- Nanotechnology Project Report
  - Review Article Selection (Week 6)
  - Report Submission (Week 15) and Report Grading (Week 16)
- Take home final exam (Week 17) and Course Final Grade (Week 18)

GNEN 6100 Weekly Schedule Spring Semester 2012

Class Number	Weekly Course Material		Assignment	
	Information Covered	Source	Description	Due Date
Week 1 Jan 9-15	**Chapter 1: pp 2-23** Introduction to Materials Science and Engineering Nanotechnology Project Report Assignment	Smith, Textbook and Blackboard Folders	Homework 1 Week 1 Viewgraphs Student Review Assignment	Week 1
Week 2 Jan 16-22	**Chapter 2: pp. 24-83** Atomic Structure and Bonding	Smith, Textbook	Homework 2 Week 2 Viewgraphs	Week 2
Week 3 Jan 23-29	**Chapter 3: pp. 84-135** Crystal and Amorphous Structure in Materials	Smith, Textbook	**Homework 3 Problems** Week 3 Viewgraphs	Week 3
Week 4 Jan 30- Feb 5	**Chapter 8: pp. 322-371** Phase Diagrams	Smith, Textbook	**Homework 4 Problems** Week 4 Viewgraphs	Week 4
Week 5 Feb 6-12	**Chapter 4: pp. 136-185** Solidification and Crystalline Imperfections **and** **Chapter 5: pp. 186-213** Thermally Activated Processes and Diffusion in Solids	Smith, Textbook	**Homework 5 Problems** Week 5 Viewgraphs	Week 5
Week 6 Feb 13-19	**Chapter 13: pp. 706-765** Corrosion Student Select and Notify Instructor of Technical Article for Nanotechnology Project Report	Smith, Textbook	**Homework 6 Problems** Week 6 Viewgraphs Approval by Instructor	Week 6
Week 7 Feb 20-26	**Chapter 6: pp. 214-279** Mechanical Properties of Metals I **Chapter 7: pp. 280-321** Mechanical Properties of Metals II	Smith, Textbook	Homework 7 Week 7 Viewgraphs	Week 7
Week 8 Feb 27- Mar 4	**Chapter 9 : pp. 372-473** Engineering Alloys	Smith, Textbook	Homework 8 Week 8 Viewgraphs	Week 8
Week 9: Spring Break Study (Mar 5-11)				

GNEN 6100 Weekly Schedule Spring 2012
(continued)

Week 10 Mar 12-18	**Chapter 10 : pp. 474-569** Polymeric Materials	**Smith, Textbook**	**Homework 9** Week10 Viewgraphs	**Week 10**
Week 11 Mar 19-25	**Chapter 11: pp. 570-641** Ceramics	**Smith, Textbook**	**Homework 10** Week 11 Viewgraphs	**Week 11**
Week 12 Mar 26-Apr 1	**Chapter 12: pp. 643-705** Composite Materials	**Smith, Textbook**	**Homework 11** Week 12 Viewgraphs	**Week 12**
Week 13 Apr 2-8	**Chapter 14: pp. 766-837** Electrical Properties	**Smith, Textbook**	**Homework 12** Week 13 Viewgraphs	**Week 13**
Week 14 Apr 9-15	**Chapter 15: pp. 838-873** Optical Properties	**Smith, Textbook**	**Homework 13** Week 14 Viewgraphs	**Week 14**
Week 15 Apr 16-22	**Chapter 16: pp. 874-921** Magnetic Properties **No later than Week 15, Student Submit Initial Nanotechnology Project Report to Instructor**	**Smith, Textbook**	**Homework 14** Week 15 Viewgraphs	**Week 15**
Week 16 Apr 23-29	**No later than Week 16, Instructor Approve and Grade Student's Final Nanotechnology Project Report**	**Student Final Edit of Nanotechnology Project Report**	**Instructor Approval of Report Due**	**Week 16**
Week 17 April 30 – May 6	**Final Exam**	**Chapters 1-15**	**Take Home Exam Posted on Website**	**Week 17**
	Week 18: End of Semester: Posting of Final Grades May 8			

6. GRADING of COURSE ASSIGNMENTS

• **Communication With Instructor**	**2 points**
⊣ **BB9 (eMail, Discussion), Phone, Office Visit**	
• **Homework (14 Assignments Weeks 1-8 and 9-15)**	**56 points**
• ***Nanotechnology Project***	
⊣ **Selection of Nanotechnology Article for Review (Week 6)**	**2 points**
⊣ **Submission of Nanotechnology Project Report (Week 16)**	**18 points**
• **Rating of the Course Electronically on Blackboard 9 (BB9)**	**2 points**
• **Final Exam (Week 17)**	**20 points**
⊣ **Covering Chapters 1-17 in Textbook by Smith**	
TOTAL	**100 points**

SCALE

• A	100-90
• A-	89-87
• B+	86-85
• B	84-80
• B-	79-78
• C+	77-75
• C	74-70
• C-	69-67
• D+	66-65
• D	64-60
• D-	59-57
• F	0-56