Course Syllabus

Course Information

Course Number/Section	**MSEN 5300.501/PHYS5376.501**
Course Title	**Introduction to Materials Science and Engineering**
Term	**Fall 2016**
Days & Times	**Thu./Fri.(RF) 5:30 pm - 6:45 p.m.**
Location	**PHY 1.103**

Professor Contact Information

Professor	**Jiyoung Kim**
Office Phone	**972-883-6412**
Other Phone	
Email Address	**jiyoung.kim@utdallas.edu**
Office Location	**NSERL 4.410**
Office Hours	**Based on Appointment**.
Other Information	

Course Pre-requisites, Co-requisites, and/or Other Restrictions

None

Course Description

This course provides a fundamental understanding of materials science and engineering. The course covers a wide variety of different topics including atomic bonding, crystal structure, material defects, diffusion, mechanical properties, deformation, failure, phase diagrams, and phase transformations. The application and processing of metals, ceramics, and polymers will be discussed along with the electrical, optical, and magnetic properties of materials

Student Learning Objectives/Outcomes

In this course, you will expected to understand fundamental knowledge as described in the following table

Objectives	**Outcome Measures**
Describe micro-structure of materials including bonds, crystals, and defects	Summaries and Problem solving in Homework/Exams
Describe mechanical behaviors and fractures	Summaries and Problem solving in Homework/Exams
Apply phase diagrams and transformation for basic material problems	Summaries and Problem solving in Homework/Exams
Structures and properties of metals, ceramics, and polymers,	Summaries and Problem solving in Homework/Exams
Describe functional properties (e.g. thermal, electrical, magnetic and optical properties) of materials	Summaries and Problem solving in Homework/Exams

Required Textbooks and Materials

Required Texts

W. D. Callister and David G. Rethwisch, ***Materials Science and Engineering; An Introduction (9th. Ed.)***, John Wiley and Sons; ISBN: 10 1-118-32457-9 (2013)
http://www.coursesmart.com/9781118324578?__professorview=false&__hdv=6.8

Required Materials

Suggested Course Materials

Suggested Readings/Texts

Further Reading Materials

C. Barrett, W. Nix, A. Teteiman, ***The Principles of Engineering Materials***, Prentice Hall, ISBN 0-13-709394 1973)

D. A. Porter and K. E. Easterling, ***Phase Transformations in Metals and Alloys, 3rd Ed***. CRC Press, ISBN 9781420062106 (2009)

A. Beiser, ***Concept of Modern Physics*** 5th Ed., McGrow-Hill, ISBN 0-07-113849-8 (1995)

W. Smith, ***Principle of Materials Science and Engineering 3rd Ed***., McGraw-Hill, ISBN 0-07-059241-1 (1996)

Robert W. Messler, ***The Essence of Materials for Engineer***, Jones & Barrett Learning, ISBM-13: 978-0-7637-7833-0 (2010)

T. Allen, ***The Structure of Materials***, Wiley, ISBN 0-471-00082-5 (1999)

Livingston, ***Electronic Properties of Engineering Materials***, Wiley, ISBN 0-471-31617-7 (1999).

S. M. Lindsay, ***Introduction to Nanoscience***, Oxford Press, ISBN 978-0-19-954421-9 (2010)

W. D. Callister, Jr., ***Fundamentals of Materials Science and Engineering: An Integrated Approach***, 2nd Ed, Wiley and Sons, Inc., ISBN 0-471-47014-7 (2005).

Assignments & Academic Calendar

*Topics, Reading Assignments, Due Dates, Exam Dates (The schedule shown below is tentative. It can be changed **without any notice in advance**.)*

Plan of Study

Date (2016)	Material	Topic	Instructor
8/25-26	Ch. 1-2	Course Introduction, Atomic Structure and Bonding in Solids	J. Kim / A. Lucero
9/1-2	Ch. 3	Crystal Structures and Crystallography	J. Kim
9/8-9	Ch. 4-5	Imperfections in Solids, Diffusion (metals)	J. Kim
9/15-16	Ch. 6-7	Mechanical Properties of Metals, Dislocations	J. Kim

9/22-23	**Ch. 7-8**	**Dislocations and Strengthening Mechanisms,**	**J. Kim**
9/29-9/30	**Ch. 8-9**	**Failure & Phase Diagram**	**J. Kim**
10/6-7		**Lab Tour / 1st Midterm Exams**	**J. Kim / A. Lucero**
10/13-14	**Ch. 10**	**Phase Transformation in Metals**	**J. Kim / A. Lucero**
10/20-21	**Ch. 11 & 12**	**Metal, & Ceramics & Polymer**	**J. Kim**
10/27-28	**Ch.12-14**	**Structures of Ceramics & Polymers**	**J. Kim**
11/3-4		**2nd Midterm/Exam**	**J. Kim / A. Lucero**
11/10-11	**Ch. 17-18**	**Corrosion & Electrical Conduction (Metals)**	**J. Kim**
11/17-18	**Ch. 18-19**	**Semiconductors, Dielectrics and Thermal Properties**	**J. Kim**
11/24-25	**Thanksgiving Week**	**No Class**	
12/1-2	**Ch. 20-21**	**Magnetic/Optical Properties**	**J. Kim**
12/9 (final exam schedule)		**Final Exam (It will be changed. Please refer your final exam schedule)**	

Homework Assignments due is usually one week after the assignment. Assignments posted on eLearning site for course as well as in class.

Grading Policy
10% Homework and Participation in Class, 50% Midterm Exams, 40% Final Exam

Course Policies

Make-up exams
Offered only under extreme circumstances

Extra Credit
N/A

Late Work
Not accepted

Special Assignments

Class Attendance
Not Required

Classroom Citizenship
See Below

Field Trip Policies / Off-Campus Instruction and Course Activities
N/A

Course Policies

1. **Exams and Final**
   - You must show all work for exam problems (excluding multiple choices or short answers) to earn partial credits
   - You will be responsible for all the reading assignments even if we do not discuss them in class
   - **Calculators will be necessary for all exams**. Graphing calculators and programmable calculators will not be allowed in the exams. No cell phones or any devices that can access internet or communicate with another human beings are allowed
   - **All exams will be closed book.** Only for final exam, you are allowed (& strongly encouraged) to bring **one 8.5" x 11" pieces of paper with hand written** formulas and constants. You must know the concepts and vocabulary for the exams.
   - You may not leave the exam room with the exam or your answers.
   - **The final exam will be comprehensive** to cover all previous midterm exam materials as well as new materials.
   - There will be **no make-up exam** except for extreme and justified circumstances with documentation
   - Grading policy : **10% Homework and Participation in Class; 25% Exam 1; 25% Exam 2; 40% Comprehensive Final** (Total 100%)

2. **Homework**
   - Homework assignments are due one week after the chapters are covered in class. Assignments will be given out in class and announced on eLearning. Students are encouraged to work together on homework assignment, but directly copying each other
   - All homeworks are due before starting the class. Late homework will not be accepted
   - Staple all your pages and write your name neatly
   - If the homework is not understood by the instructor or any other grader, the homework will not be graded or get credits. In order to get full credits, students should provide **clean, legible and well organized homework**. It is strongly *discouraged to scratch away your answers (or arrow to somewhere else)*. Students should submit clearly readable hand-written homework
   - Show work and check your units
   - There will be no extra credits
   - Printed homework is not accepted

3. **Class attendance and citizenship**
   - Class attendance is not required but highly advised
   - See below for classroom conduct

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern

student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork

to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

Off-Campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address given below. Additional information is available from the office of the school dean. (http://www.utdallas.edu/Business Affairs/Travel_Risk_Activities.htm)

These descriptions and timelines are subject to change at the discretion of the Professor. The Instructor may change material, course content, and course pace or item sequence at any time.