SCME 101 Introduction to Materials (3 credits)
2/2022

Course Coordinator: Asst. Prof. Dr. Manthana Jariyaboon (manthana.jar@mahidol.ac.th)

Instructors: Asst. Prof. Dr. Chayanisa Chitichotpanya (chayanisa.chi@mahidol.ac.th)
Assoc. Prof. Dr. Toemsak Srikhirin (toemsak.sri@mahidol.edu)
Asst. Prof. Dr. Manthana Jariyaboon (manthana.jar@mahidol.ac.th)

Class Schedule: **Monday: 10.30 a.m. – 12.00 p.m.**
Wednesday: 11.30 a.m. – 13.00 p.m.

Google classroom class code: i25ktmh

Room: SC1-156

Course Goals:

The course goals are to introduce fundamental concepts in materials science. Students will learn properties of materials, bonding and atomic structure of crystalline solids, defects in crystals, diffusion, mechanical properties of metals, dislocations, hardening, failure, phase diagram and phase change in metals, heat treatment of metals and alloys, ceramics and glass, polymers, polymer processing, corrosion, nano-materials. Students should be able to use the knowledge to solve practical problems related to materials in daily life.

Course-level Learning Outcomes (CLOs):

By the end of the course, students are able to

- CLO1 Explain properties of materials, bonding and atomic structure of crystalline solids, defects in crystals, diffusion, mechanical properties of metals, dislocations, hardening, failure, phase diagram and phase change in metals, heat treatment of metals and alloys, ceramics and glass, polymers, polymer processing, corrosion and nano-materials correctly
- CLO2 Select appropriate materials for the chosen applications
- CLO3 Apply the knowledge gained correctly to solve basic practical problems related to materials in daily life
- CLO4 Communicate and present the knowledge in materials science efficiently in English with target audiences in both oral and written forms
- CLO5 Collaborate and work appropriately with team to reach common goals based on roles and responsibilities assigned

Schedule:

Wk	Date	Topic	Hrs.	Instructor
1	9 Jan 2023 11 Jan 2023	No class		
2	16 Jan 2023 18 Jan 2023	Introduction, atomic structure and interatomic bonding	3	Dr. Chayanisa Chitichotpanya
3	23 Jan 2023 25 Jan 2023	Type of solid and crystal structure	3	Dr. Chayanisa Chitichotpanya
4	30 Jan 2023 1 Feb 2023	Imperfection in solids	3	Dr. Chayanisa Chitichotpanya
5	6 Feb 2023 8 Feb 2023	Diffusion, abrasion and wear	3	Dr. Chayanisa Chitichotpanya
6	13 Feb 2023	Mechanical properties	1.5	Dr. Chayanisa Chitichotpanya
	15 Feb 2023	Polymer structure	1.5	Dr. Toemsak Srikhirin
7	20 Feb 2023 22 Feb 2023	Polymer structure	3	Dr. Toemsak Srikhirin
8	27 Feb 2023 1 March 2023	Characteristics, Applications, and Processing of Polymers	3	Dr. Toemsak Srikhirin
9	7-10 March 2023	Midterm Exam Week		
10	13 March 2023 15 March 2023	Structure and Properties of Ceramics and Metal, A pplications and processing of Ceramics and Metal	3	Dr. Toemsak Srikhirin
11	20 March 2023 22 March 2023	Composite materials	3	Dr. Toemsak Srikhirin
12	27 March 2023 29 March 2023	Phase diagram	3	Dr. Manthana Jariyaboon
13	3 April 2023 5 April 2023	Phase diagram	3	Dr. Manthana Jariyaboon
14	10 April 2023	Phase diagram	3	Dr. Manthana Jariyaboon
	12 April 2023	Phase Transformations in Metals		

Wk	Date	Topic	Hrs.	Instructor
15	17 April 2023	No class	1.5	Dr. Manthana Jariyaboon
	19 April 2023	Phase Transformations in Metals		
16	24 April 2023	Corrosion	3	Dr. Manthana Jariyaboon
	26 April 2023			
17	1-12 May 23	Final Exam Week		

Texts and main documents

1) Foundation of Materials Science and Engineering, W. Smith, J. Hashemi, McGrawHill, NY
2) Fundamentals of Materials Science and Engineering, D. Callister, Jr. J. Wiley & Sons, NY