

## SCME 101 Introduction to Materials (3 credits)

**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 Srihirin (toemsak.sri@mahidol.ac.th)

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:** gkfl7kf

**Room:** SC1-156 (onsite/or hybrid class when permitted)

### 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

<b>Evaluation:</b>	Attendance	5 %
	Homework/report/assignment	15 %
	Quiz	10 %
	Exam.....	70%
	<u>Total</u>	<u>100 %</u>

Score (percentage)	Symbols
75-100	A
69-74	B+
62-68	B
55-61	C+
48-54	C
42-47	D+
36-41	D
0- 35	F

**Schedule:**

Wk	Date	Topic	Hrs.	Instructor
<b>Week 1-8: Live online class**</b>				
1	18 Jan. 21	Introduction, atomic structure and interatomic bonding	3	Dr. Chayanisa Chitichotpanya
	20 Jan. 21			
2	25 Jan. 21	Type of solid and crystal structure	3	Dr. Chayanisa Chitichotpanya
	27 Jan. 21			
3	1 Feb. 21	Imperfection in solids	3	Dr. Chayanisa Chitichotpanya
	3 Feb. 21			
4	8 Feb. 21	Diffusion, abrasion and wear	3	Dr. Chayanisa Chitichotpanya
	10 Feb. 21			
5	15 Feb. 21	Mechanical properties	3	Dr. Chayanisa Chitichotpanya
	17 Feb. 21			
6	22 Feb. 21	Polymer structure	3	Dr. Toemsak Sriksirin
	24 Feb. 21			
7	1 Mar. 21	Characteristics, Applications, and Processing of Polymers	3	Dr. Toemsak Sriksirin
	3 Mar. 21			
8	8 Mar. 21	Characteristics, Applications, and Processing of Polymers	1.5	Dr. Toemsak Sriksirin
	10 Mar. 21			
9	15-19 Mar. 21	Midterm Exam Week		

Wk	Date	Topic	Hrs.	Instructor
<b>Week 10-16: Live online class**</b>				
10	22 Mar. 21	Structure and Properties of Ceramics and Metal,	3	Dr. Toemsak Sriksirin
	24 Mar. 21	Applications and processing of Ceramics and Metal		
11	29 Mar. 21	Composite materials	3	Dr. Toemsak Sriksirin
	31 Mar. 21			
12	5 Apr. 21	Phase diagram	3	Dr. Manthana Jariyaboon
	7 Apr. 21			
13	12 Apr. 21	No class (Special holiday)		
	14 Apr. 21	no class (Songkran Day)		
14	19 Apr. 21	Phase diagram, Phase Transformations in Metals	3	Dr. Manthana Jariyaboon
	21 Apr. 21			
15	26 Apr. 21	Phase Transformations in Metals, Corrosion	3	Dr. Manthana Jariyaboon
	28 Apr. 21			
16	3 May 21	Corrosion	3	Dr. Manthana Jariyaboon
	5 May 21			
17	10-21 May 21	Final Exam Week		

\*\* Remain subject to change dependent on the changing circumstances of COVID-19.

#### 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