

Subject Description Form

Subject Code	ME1D02
Subject Title	Products and Materials in Modern Society
Credit Value	3
Level	1
GUR Requirements Intended to Fulfill	<p>This subject intends to fulfill the following requirement(s):</p> <p> <input type="checkbox"/> Healthy Lifestyle <input type="checkbox"/> Freshman Seminar <input type="checkbox"/> Languages and Communication Requirement (LCR) <input type="checkbox"/> Leadership and Intra-Personal Development <input type="checkbox"/> Service-Learning <input checked="" type="checkbox"/> Cluster-Area Requirement (CAR) <input type="checkbox"/> Human Nature, Relations and Development [CAR(A)] <input checked="" type="checkbox"/> Science, Technology and Environment [CAR(D)] <input type="checkbox"/> Chinese History and Culture [CAR(M)] <input type="checkbox"/> Cultures, Organisations, Societies and Globalisation [CAR(N)] <input type="checkbox"/> China-Study Requirement <input type="checkbox"/> Yes or <input type="checkbox"/> No <input checked="" type="checkbox"/> Writing and Reading Requirements <input checked="" type="checkbox"/> English or <input type="checkbox"/> Chinese </p>
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	<p>This subject aims to provide an introduction to materials' needs in modern society, covering aspects of:</p> <ul style="list-style-type: none"> • History of materials application • Fundamental theory and concepts • Classifications and properties • Sustainability in materials technology and green product development • Integration of advanced materials in modern society • Future trends in materials technology
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> (a) Appreciate materials technology as a key driving force in human history through literature search. (b) Understand the fundamental theory and concepts related to materials. (c) Relate material types to their major properties. (d) Understand the updated material technology and evolution of new materials in sustainable product development. (e) Make reasonable judgment and recommendations on materials selection for consumer products and/or industrial applications.

	<p>(f) Communicate efficiently with sound materials knowledge, good oral presentation and report writing skills through projects.</p> <p>(g) Appreciate contemporary materials issues on resource reservation, environment protection, and sustainable economical development; and be capable to understand future trends in integration of advanced materials.</p> <p>(h) Enhance communication skills in both English Reading and Writing.</p>
Subject Synopsis/ Indicative Syllabus	<p>History of materials technology: Stone Age, Bronze Age, Iron Age, and the Age of Functional Materials; materials technology as a key driving force in human society development.</p> <p>Basic theory and concepts: fundamental mechanical properties of materials (stiffness, elasticity and plasticity), relationship between structure and properties.</p> <p>Materials classification and properties: strength of structural materials such as ceramics, metals and alloys, polymers and fibers; unique properties of functional materials such as semiconductors, electrical-thermal-mechanical conversion materials (smart materials); wonderful world of nanomaterials.</p> <p>Applications of materials in products: examples in automobiles, aircrafts, home electronics, smart devices (smart phones/smart watches) health care and medical products, sports equipment, textile, civil structures, furniture and jewelry products; materials selection method.</p> <p>Sustainability of materials technology: world resources vs. materials' needs; economical and environmental considerations in materials selection for sustainable product development; materials recycling; future trends in materials technology.</p>
Teaching/Learning Methodology	<p>This is an introductory course aiming at arousing students' awareness of materials' needs in sustainable product development. It also aims at developing interest and curiosity in materials technology among students having different educational backgrounds. It is not the intention of the subject to pre-empt any specific topic that is to follow. In addition to the traditional classroom lectures, hands-on workshops, group projects and small-group discussions will be used extensively. In fact, the intended outcomes are best achieved through real-life examples and experiments.</p> <p>In order to fulfill both English Reading and English Writing requirements, every student studying this subject will be required to perform an extensive reading and writing tasks. The knowledge obtained from the reading task will be used to perform a case study and an oral presentation is required. Students are also required to conduct a mini project on a given topic and produce a written report in order to satisfy the writing requirement.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed							
			a	b	c	d	e	f	g	h
	1. Written examination	30		√	√		√		√	
	2. Experiment/workshop	20	√	√	√	√	√			
	3. Mini project report	30	√	√	√	√	√	√	√	√
	4. Procedure to perform the mini	10	√	√	√	√	√		√	√
	5. Oral presentation on the case study	10	√	√	√	√	√	√	√	√
	Total	100 %								
	Written examination is only a small part of the assessment (30%). Part of the continuous assessment will be based on the individual performance in experiments/hands-on workshops (20%).									
	There is a major writing task required: a written report (30%) of a mini project performed by every student on a given topic. The proper procedure to perform the mini project including objective identification, literature search, project planning and time control to complete the planned tasks will also be assessed (10%).									
<i>In order to fulfill the writing component assessment, student should attain a minimum grade D in both tasks 3 and 4.</i>										
Students are required to conduct a case study. In order to complete the case study, knowledge obtained from an intensive reading task will be required. References should be provided to students by the subject instructor. Information provided by the guest lecturer, if any, will also be very useful. An oral presentation of the case study is required (10%).										
<i>In order to fulfill the reading component assessment, student should attain a minimum grade D in task 5.</i>										
Student Study Effort Expected	Class contact:									
	▪ Lectures					21 Hrs.				
	▪ Laboratory Test					6 Hrs.				
	▪ Tutorials					6 Hrs.				
	▪ Discussion on Case Study and Mini Project					6 Hrs.				
	Other student study effort:									
	▪ Mini Project, Case Study and English					60 Hrs.				
	▪ Private Study					21 Hrs.				
	Total student study effort					120 Hrs.				

Reading List and References	<ol style="list-style-type: none"> 1. R. E. Hummel, Understanding Materials Science: History, Properties, Applications, latest edition. 2. J. Jacobs and T. Kilduff, Engineering Materials Technology: Structure, Processing, Properties, and Selection, Pearson/Prentice Hall, latest edition. 3. K.G. Budinski and M.K. Budinski, Engineering Materials: Properties and Selection, Pearson/Prentice Hall, latest edition. 4. P.L. Mangonon, The Principles of Materials Selection for Engineering Design, Prentice Hall, latest edition. 5. William D. Callister Jr., David G. Rethwisch, Materials Science and Engineering: An Introduction, New York: John Wiley & Sons, latest edition.
------------------------------------	---

Revised May 2022