



COURSE INFORMATION

Faculty:	Faculty of Chemical and Energy Engineering		
Program name:	Bachelor of Chemical Engineering (Gas) with Honours		
Course code:	SKTG 2363	Academic Session/ Semester:	2024/2025-1
Course name:	Material Engineering	Pre/co requisite (course name and code, if applicable):	Engineering Mechanics
Credit hours:	3		

Course synopsis	The first part of SKTG 2363 is introductory of Materials Engineering. Topics include classification of materials (metals, ceramics, polymers, composites and semiconductors); atomic bonds; crystal structure; crystalline defects and solid solutions; and phase diagrams. Main emphasis is on metals because metals are structurally the simplest to characterize and a sound knowledge of structure-property relation of metals can be extended to the study of ceramics and polymers. The second part of the course deals with Mechanics of Materials. Topics cover stress and deformation of members under axial loading, torsion in circular shafts, analysis and design of beams for bending, and stress transformation. Throughout the course, strong emphasis is placed on drawing a free-body diagram and selecting appropriate coordinate system using the correct sign convention.			
Course coordinator (if applicable)	Dr. Zulhairun Bin Abdul Karim			
Course lecturer(s)	Name	Office	Contact no.	E-mail
	Dr. Zulhairun Abdul Karim	N01	0179548986	zulhairun@utm.my
	Dr. Mohsin Mohd Sies	N01-272	0192491812	mohsin@utm.my

No.	CLO*	PLO (MQF Code)	Taxonomies and generic skills	T&L methods	Assessment methods
CLO1	Describe the relation for the structure-property of various engineering materials with the strength of materials.	PLO1 (C1)	C2 (S)	Lecture, tutorial	Q,T, F
CLO2	Apply concepts of stress, strain and elastic behavior of engineering materials involving structural members subjected to axial loading, torsion, and bending.	PLO1 (C1)	C3 (S)	Lecture, tutorial	Asg, Q, T, F
CLO3	Analyse the structural members under axial loadings by shear force and bending moment diagram.	PLO1 (C1)	C4 (S)	Lecture, tutorial	Q,T, F
CLO4	Apply Mohr's circle method to determine the stress transformation of a stress element.	PLO1 (C1)	C3 (S)	Lecture, tutorial	Asg, F
CLO5	Able to perform collectively as a group in solving the material engineering problem.	PLO10 (C3F)	A2 (CC, SI)	Project Based Learning	PR

Assessment methods:
T – Test; Q – Quiz; Asg – Assignment; F – Final Exam; PR - Project Report

MQF Cluster Code:
C1 = Knowledge & Understanding, C3F = Leadership, Autonomy & Responsibility

Graduate Attributes:
S=scholars, CC=Constructive citizen, SI= Social intelligence

No	Type	Implementation
1	Project Based Learning	Project will be given based on various materials and will be conducted in group

[illegible]

Week 5	• Torsional loads on circular shafts • Shafts deformation • Shearing strain • Angle of twist	2	3	1							2		6
Week 6	• Torsional loads on circular shafts • Shafts deformation • Shearing strain • Angle of twist	2	3	1							2		6
Week 7	• Pure bending • Bending deformation • Strain due to bending • Stress due to bending	3	3	1							2		6
Week 8	Mid-semester Break												
Week 9	• Pure bending • Bending deformation • Strain due to bending • Stress due to bending	3	3	1							2		6
Week 10	• Beam Section properties • Properties of American Standard shapes	3	3	1							2		6
Week 11	• Beam Section properties • Properties of American Standard shapes Design	3	3	1							2		6
Week 12	• Beam analysis • Shear and bending moment diagrams	3	3	1							2		6
Week 13	• Beam analysis • Shear and bending moment diagrams	3	3	1							3		7
Week 14	• Stress transformation • Transformation of plane stress • Principal stresses • Maximum shearing stresses • Equation method	4	3	1							3		7
Week 15	• Stress transformation • Transformation of plane stress • Principal stresses • Maximum shearing stresses • Mohr Circle method	4	3	1							3		7
SUB-TOTAL SLT :											85		

Continuous Assessment		%	Face-to-Face (F2F)		NF2F		TOTAL SLT
			Physical	Online (Synchronous)	Online (Asynchronous)	Others	
1	Quiz	15	1.5	2	2	2	7.5
2	Assignment (individual)	5	1.5		2	2	5.5
3	Project Report (group)	10	2		2	2	6
4	Test	30	3			4	7
SUB-TOTAL SLT :							26

Summative Assessment		%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT
			Physical	On line	Online	Others	
1	Final examination	40	3			6	9
					SUB-TOTAL SLT :		9
					SLT for		35
					GRAND		120
A	% SLT for F2F Physical Component				55.83		
B	% SLT for Online & Independent				44.17		
C	%SLT for Online Component:				30.83		
D	% SLT for All Practical Component:				0.00		
D1	% SLT for F2F Physical				0.00		
D2	% SLT for F2F Online Practical				0.00		
Please tick (/)if this course Industrial Training/ Clinical Placement/ Practicum using 50% of Effective Learning Time (ELT)							

Identify special requirement or resources to deliver the course (e.g.,software,nursery, computer lab, simulation room etc)

None

References (include required and further readings, and should be the most current)

Text book

Mechanic of Materials, Craig, R.R. and Taleff, E.M., 4th Edi, Wiley. (2020)
Mechanic of Materials, Beer, F.P., Johnston, J.R., DeWolf, J.T., Mazurek, D.F. 6th Edi, Mc Graw Hill. (2012)

Main references

Mechanics of Materials. Hibbeler, R.C.,8th Edition. Singapore: Prentice Hall.(2010).

Online

<http://elearning.utm.my>

Other additional information (if applicable)

Academic honesty and plagiarism:

Assignments are group activities. Copying of work (texts, simulation results etc.) from other groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of zero for the assignment and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

Other additional information (if applicable)

Final Exam Attendance:

Attendance to the Final Examination is **COMPULSORY**. Absence to the Final Exam without valid permission or medical certificate will result in a Failed Grade for the course.

Disclaimer:

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Prepared by:		Certified by:	
Name:	Dr. Zulhairun Bin Abdul Karim	Name:	
Signature:		Signature:	
Date:	7 October 2024	Date:	