KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
KUCHING SARAWAK

JABATAN KEJURUTERAAN MEKANIKAL

DJJ30323 & STRENGTH OF MATERIALS

LECTURER NAME		
TYPE OF ASSESSMENT		
TOPIC		
DURATION		
DATE OF ASSESSMENT		
STUDENT'S INFORMATION	***NAME***	***REGISTRATION NO.***
TOTAL MARKS	***CLO3***	***/100***

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PRACTICAL TASK 1 & TENSILE TEST

CLO 3	Organize appropriately experiment in groups according to Standard Operation Procedures. (P4, PLO5)	**PLO5**	DK6: ENGINEERING PRACTICE DP1: DEPTH OF KNOWLEDGE DP3: DEPTH OF ANALYSIS REQUIRED DP4: FAMILIARITY OF ISSUES

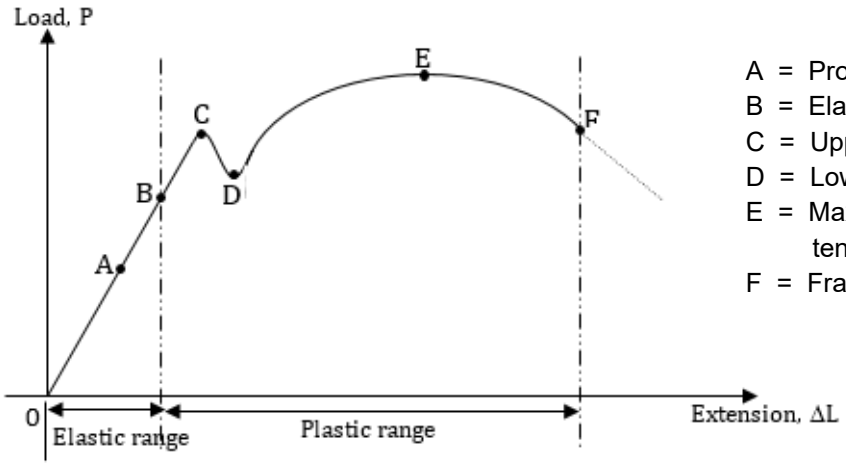
A. TITLE

Observation of stress and strain curves.

B. OBJECTIVES

To develop an understanding of the methodology of tensile testing and to calculate the stress and the strain curves from the load displacement curves.

C. TOPIC SUMMARY/ THEORY



A = Proportional limit
B = Elastic limit
C = Upper yield point
D = Lower yield point
E = Maximum Load (maximum tensile strength)
F = Fracture point

Hooke's Law;

For ductile materials, stress is proportional to strain in elastic range.

□ □ □ or □ / □ = constant

Constant in Hooke's Law is defined as Modulus of Elasticity or known as Young's Modulus.

From the graph:

The formula of gradient of the graph; $m = \frac{\Delta P}{\Delta L}$

The formula of Young's Modulus; $E = m(\frac{L_o}{A_o})$

D. MATERIAL / TOOLS

Lists of apparatus:

i. Tensile test machine.
ii. A set of specimens.
iii. A set of loads.
iv. Load cell.
v. Vernier caliper.

E. GENERAL INSTRUCTION / SAFETY PROCEDURE

i. Wear suitable attire when in the lab.
ii. Wear safety goggles while handling the liquids.
iii. Always clean droplets or excessive liquid at the working area during and after experiments.
iv. Always obey the Lecturer/Lab Assistant instructions.

F. WORK INSTRUCTION / PROCEDURE

Lists of procedure:

i. Measure the length, L and the diameter, d of the specimen using measuring tape.
ii. Place the load in the machine.
iii. Connect the load cell to the tensile test machine.
iv. Switch on the machine. Press the tare button to get ‘0N’ on display.
v. Install the clamps using the pins.
vi. Place the specimen vertically aligned between the grips of both clamps.
vii. Click on ‘start’ button. Both upper and bottom grips will start moving in opposite direction according to the specified pulling rate.
viii. Record the display’s reading in Table 6.1 and Table 6.2 when the specimen fails. The value displayed represents the value of elongation.
ix. Place another load and repeat step (vi) to (viii).
x. Repeat from step (i) for another specimen.

G. RESULT

Table 6.1: Mild Steel

Case	Value of Load, P (N)	Length, L (m)	Diameter , d(m)	Elongation, ∆L (m)	Specimen Area, A (m)	Gradient, m (N/m^2)	Young's Modulus E (N/m^2)
1							
2							
3							
4							
5							
6							

Table 6.2: Aluminum Alloy

Case	Value of Load, P (N)	Length, L (m)	Diameter , d(m)	Elongation, ∆L (m)	Specimen Area, A (m)	Gradient, m (N/m^2)	Young's Modulus E (N/m^2)
1							
2							
3							
4							
5							
6							

6(i) Find the cross-sectional area of specimens' mild steel and aluminium alloy:

The formula of cross-sectional area; $\boldsymbol{A_o = \frac{\pi d^2}{4}}$

A_{al} =	A_s=

6(ii) Plot the graph for both specimens (Load vs elongation) by using appropriate scale.

a) Graph (Mild Steel)

b) Graph (Aluminium alloy)

6(iii) Analyze the values of gradient (m) and Young's Modulus (E) of the specimens from both graphs and then fill in the values in Table 6.1 and 6.2.

H. DISCUSSION

i. Discuss the reaction that happens when a load is applied to the specimen and discuss why the condition occurred.

ii. Discuss the results of the tensile test for aluminium alloy and mild steel specimens.

iii. Discuss the probable factors that affect the accuracy of this experiment.

I. CONCLUSIONS

Make a conclusion about the experiment.

J. REFERENCES

List down all the books and journals referred.

PREPARED BY: *(Course Lecturer)* *……* *( )* ***Date:***	***CHECKED BY:*** *(Course Coordinator/ Head of Programme)* *……* *( )* ***Date:***	***APPROVED BY:*** *(Head of Programme/ Head of Department)* *……* *( )* ***Date:***