COURSE OUTLINE

Department & Faculty: **Dept. of Mechanical Engineering and Management** **Centre for Diploma Studies, SPACE, UTM Kuala Lumpur**	Page :
Course Code: DDWJ 1203 (STATICS) **Total Lecture Hours: 42 Hours** **Total Tutorial Hours: 14 Hours**	Semester: : Academic Session: :

PRE-REQUISITE   :   DDPS 1713

Lecturers	E-Mail	Room No.	Phone No.
1. Norhashimah Omar	norhashimah.kl@utm.my	F 301 L	0326154626
2. Dr Mohamad Zaki bin Hasaan	mzaki.kl@utm.my	F301B	0326154629
3.			
4.			

SYNOPSIS

This course will introduce the students with the concepts of the first, second and third Newton Laws. Later each law is applied to a particle and then to rigid bodies which are subjected to a system of coplanar forces. A general case of 2D and 3D force systems acting on rigid bodies are then introduced.

PREPARED BY :	**CERTIFIED BY :**
Name : Norhashimah Omar	**Name** :
Signature :	**Signature** :
Date : 16 March 2016	**Date** :

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COURSE LEARNING OUTCOMES

By the end of the course, students should be able to :

No.	Course Learning Outcomes	Programme Learning Outcome(s) Addressed	Taxonomy Level and Generic Skills	Assessment Methods
1.	State the first, second and third laws of Newton	PLO1	C2	T1
2.	Express the force and position vector in Cartesian form and calculate the vectors' magnitude and direction.	PLO1	C3	HW, Q, T1, F
3.	Draw the free body diagrams for a particle and for rigid bodies and solve particle and rigid bodies equilibrium problems using the equations of equilibrium in 2D and 3D	PLO3	P3 CTPS2	HW, T2, F
4.	Calculate the forces acting on structures such as trusses, frames and machines	PLO3	P2 CTPS2	HW, T2, F
5.	Locate the center of gravity, center of mass and centroid for a system of discrete particles and a body of arbitrary shape and friction problems	PLO1	C3	HW, T3, F
6.	Practise ethics when solving engineering problems	PLO8	A4 EM2	HW

Note :
   (T – Test ; PR – Project ; Q – Quiz; HW – Homework ; Pr – Presentation; F – Final Exam, RP - Report)

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STUDENT LEARNING TIME

No.	Teaching and Learning Activities	Student Learning Time (hours)
1.	Class Hour - Lecture 3hrs × 14 weeks = 42 - Tutorial 1 hr x 14 weeks =14	56
2.	Practical / lab work	-
3.	Independent Study - self learning - information search - library search - reading	42
4.	Assignment - self learning - group discussion	10
5.	Project - Information search - Library search - Group discussion - Report writing	-
6.	Tests and preparation for the test - Test: 3 tests × 1hr = 3 hrs - Preparation: 3 tests × 3hrs = 9 hrs	12
Total		**120**

TEACHING METHODOLOGY

1. Theoretical briefing related to the topics and problems involved will be given

2. Method of solving related topic problems will be discussed.

3. Students are required to solving problems individually and by group.

4. Students are required to submit solved problems in class on time.

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WEEKLY SCHEDULE

Week	Lecture	Topic / Content

1	1
	2
	3
		1.0 Force
		  - Scalars and vectors
		  - Introduction to Vector Operations
		     Vector addition, vector subtraction and resolution of vector

2	4
	5
	6
		2.0 Force Vectors
		  - Vector addition of forces
		  - Cartesian Vectors
		     Addition/subtraction of Cartesian vectors
		Quiz

3	7 8 9	- Position vectors - Force vector directed along a line Dot product

4	10
	11
	12
		3.0 Equilibrium of a Particle
		  - Condition for the Equilibrium of a Particle
		  - The Free-body diagram
		  - Coplanar force systems
		     Three- Dimensional force systems

5	13
	14
	15
		4.0 Force System Resultants
		  - Moment of a force-scalar formulation
		  - Cross product
		  - Moment of a force- vector formulation
		Test 1

6	16
	17
	18
		- Principle of moments
		  - Moment of a force about a specified axis
		  - Moment of a couple

7	19 20 21	- Equivalent system - Resultants of a force and couple system

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		- Further reduction of a force and couple system

WEEKLY SCHEDULE
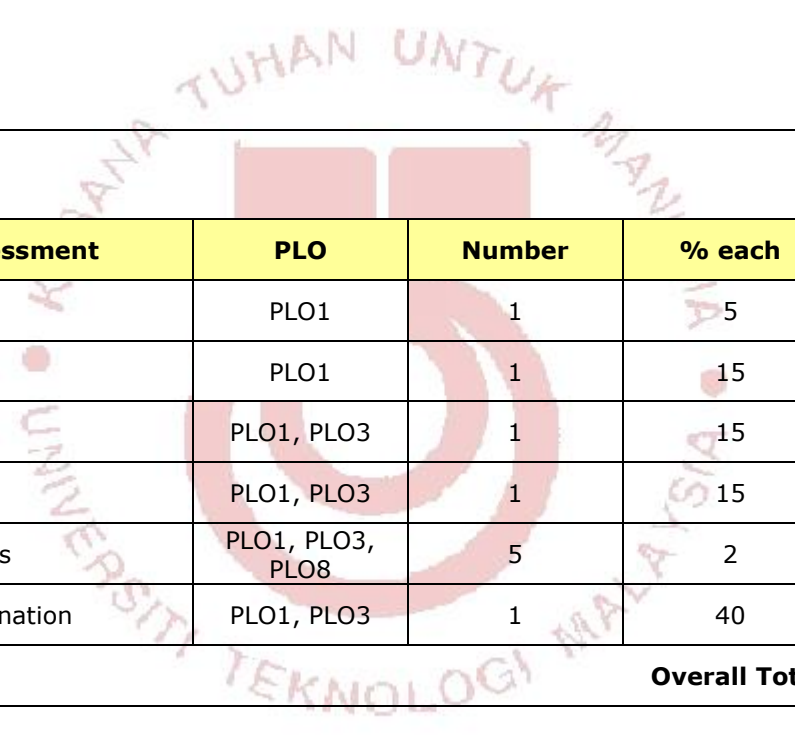
Week	Lecture	Topic / Content
8		**MID SEMESTER BREAK**
9	22 23 24	**5.0 Equilibrium of a Rigid Body** - Conditions for Rigid Body Equilibrium - Equilibrium in 2D - Equilibrium in 3D

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10	25 26 27	**6.0 Structural Analysis** - Simple Trusses - Method of joints - Zero-force members - Method of sections.
11	28 29 30	- Frames - Machines **Test2**
12	31 32 33	**7.0 Center of Gravity and Centroid** - Center of gravity and center of mass for a system of particles - Center of gravity, center of mass and centroid for a body
13	34 35 36	- Composite bodies - Theorems of Pappus and Guldinus
14	37 38 39	**8.0 Dry Friction** - Characteristics of dry friction - Problems involving dry friction
15	40 41 42	- Wedges **Test 3**
16-18		**REVISION WEEK AND FINAL EXAMINATION**

REFERENCES

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1. Hibbeler, R.C.; "Engineering Mechanics: STATICS", 13th edition, Pearson and Prentice Hall, 2014.
2. .Ferdinand P.Beer & E. Russel Johnston, Mechanics For Engineers, Statics Mc Graw Hill
3. J. L. Meriam & L.G. Kraige, Engineering Mechanics, Statics, John Willey

GRADING

No.	Assessment	PLO	Number	% each	% total
1.	Quiz	PLO1	1	5	5
2.	Test 1	PLO1	1	15	15
3.	Test 2	PLO1, PLO3	1	15	15
4.	Test 3	PLO1, PLO3	1	15	15
5.	Assignments	PLO1, PLO3, PLO8	5	2	10
5.	Final Examination	PLO1, PLO3	1	40	40
				Overall Total	100

ATTENDANCE

The student should adhere to the rules of attendance as stated in the University Academic Regulation :-

1. Student must attend not less than 80% of lecture hours as required for the subject and must conduct all the experiments.

2. The student will be prohibited from attending any lecture and assessment activities upon failure to comply the above requirement. Zero mark will be given to the subject.