Course Syllabus (Academic Year 2023)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title** : KAED 222 Engineering Mechanics
   Credit (study hours) : 3 (3-0-6)
2. **Program Name** : Bachelor of Engineering in Environmental Engineering and Disaster Management
3. **Course Module** : Major Required Course
   Pre/co-requisite : SCPY 151 (General Physics I)
4. **Class Semester** : ☐ 1st Semester ☑ 2nd Semester Academic Year 2023
5. **Class Schedule & Venue** : Monday 13:00-16:00, Onsite course (MUKA e-learning)
6. **Class Coordinator** : Dr. Watcharapol Wonglertarak
   watcharapol.won@mahidol.ac.th, Tel 085 849 3199

7. Course description

Force system; resultant; equilibrium; kinematics and kinetics of particles and rigid Bodies; Newton's second law of motion.

8. Course Objectives / Course Learning Outcomes (CLOs)

No.	Objectives/CLOs	Expected Skills/ Knowledge			
		Specific (S)	Generic (G)	Knowledge (K)	PLOs
8.1	To understand force system and identify type of force	S1	G1	K1	1
8.2	To calculate resultant force, equilibrium force, friction force, and distributed forces	S1	G1	K1, K2	1
8.3	To identify type of motion and force	S1	G1	K1, K2	1
8.4	To calculate forces related to velocity and acceleration	S1	G1	K1, K2, K3	1

Specific Competences

S1 Ability to apply knowledge of mathematics, physics, and engineering

Generic Competence

G1 Systematic thinking, problem solving, and analytical skills

Knowledge Competence

K1 Calculus and vector mechanics

K2 Force systems, motions and equilibrium

K3 Kinematics and kinetics of particles and rigid bodies

9. Class instructor list

Dr. Watcharapol Wonglertarak Contact No. 085 849 3199 Email: watcharapol.won@mahidol.ac.th

10. Course Outline

Week	Date	Contents	CLOs	Teaching & Learning method	Instructor
1	8/1/2024	Introduction: Conversion	8.1	Course Syllabus and Lecture	WW
2	15/1/2024	Force systems: Two Dimensions	8.1, 8.2	Presentation, Activity, and Assignment	WW
3	22/1/2024	Force systems: Three Dimensions	8.1, 8.2	Presentation, Activity, and Assignment	WW
4	29/1/2024	Forces and Moments	8.1, 8.2, 8.3	Presentation, Activity, and Assignment	WW
5	5/2/2024				
6	12/2/2024	Equilibrium of Rigid Bodies	8.1, 8.2	Presentation, Activity, and Assignment	WW
7	19/2/2024	Equilibrium in Three Dimensions	8.1, 8.2	Presentation, Activity, and Assignment	WW
8	26/2/2024	Day off			
9	4-8/3/2024	**Mid-term Examination**			
10	11/3/2024	Friction Force	8.1, 8.2	Presentation, Activity, and Assignment	WW
11	18/3/2024	Kinetics of Particles (Axes x-y)	8.1, 8.2	Presentation, Activity, and Assignment	WW
12	25/3/2024	Kinetics of Particles (Axes n-t)	8.1, 8.2	Presentation, Activity, and Assignment	WW
13	1/4/2024	Plane Motion of Rigid Bodies: Motion Relative to Rotating Axes Plane Motion of Rigid Bodies: Relative Velocity	8.1, 8.2, 8.4	Presentation, Activity, and Assignment	WW
14	8/4/2024	Day off			
15	15/4/2024	Day off			
16	22/4/2024	Plane Motion of Rigid Bodies: Relative Acceleration	8.1, 8.2, 8.4	Presentation, Activity, and Assignment	WW
17	29/4/2024-10/5/2024	**Final Examination**			

11. Course Assessment

No.	Methods/Activities	Regulations	CLOs	Week	Weight Distribution (%)
1	Class participation and Class attention	Learner must attend the class more and 80% of course.	-	All	5
2	Quiz	Learner must be testing the knowledge of previous week	8.1, 8.2, 8.3, 8.4	All	10
3	Assignment	- Learner must practice the engineering skills via exercises and assignments form each topic. - The score will be evaluated according to the quality and details of work by instructors of those topics.	8.1, 8.2, 8.3, 8.4	All	15
4	Midterm Examination	The scope of exam will be cover topics of the 1^{st}-8^{th} week in this course.	8.1, 8.2, 8.3	9	35
5	Final Examination	The scope of exam will be cover topics of the 10^{th}-15^{th} week in this course.	8.1, 8.2, 8.4	16	35
				Total	**100**

12. Grading system

Grade	Score	Grade	Score
A	≥ 80%	B+	75-79.99 %
B	70-74.99%	C+	65-69.99%
C	60-64.99%	D+	55-59.99%
D	50-54.99%	F	<50

However, the rubric scoring scale will be applied for evaluation the student performance along their tasks, such as assignment responsibility, presentation skill, and use of language, and organization capability.

13. References

1. Beer, F.P., Johnston, E.R., Mazurek, D.F., (2019). Vector Mechanics for Engineers: Statics (12th ed.): McGraw-Hill.
2. Hibbeler, R.C., (2015). Mechanics for Engineers: Statics (14th ed.): Pearson Education South Asia Ple Ltd.
3. Hibbeler, R.C., (2015). Mechanics for Engineers: Dynamics (14th ed.): Pearson Education South Asia Ple Ltd.
4. สิริศักดิ์ ปโยธรสิริ (2547). กลศาสตร์วิศวกรรม ภาคสถิตยศาสตร์ (พิมพ์ครั้งที่ 2)