

CE 202 Engineering Mechanics-Statics

Course: **Core course**Semester: **1** Year: **2016**Prerequisite: **SC 133 Physics for Engineers I**Credit: **3 (3-0-6)****Instructors:**

Assistant Prof. Chaisak Pisitpaibool	Section: 0200 01, CE (T&Th 09:30-11:00) Room 308
Assistant Prof. Danai Wantanakorn	Section: 0200 02 CE (T&Th 09:30-11:00) Room 313
Assistant Prof. Naret Limsamphancharoen	Section: 0300 01 ME(T&Th 11:00-12:30) Room 604-3
Associate Prof. Burachat Chatveera	Section: 0700 01 IE (W&F 09:30-11:00) Room 308
Ajarn.Dr. Krisada Chaiyasarn	Section: 0700 02 IE (W&F 09:30-11:00) Room 305

Objectives:

Students are expected to

- ◆ understand the key concepts, laws, and basic principles of statics.
- ◆ progress in a mechanics course only by understanding the physical and mathematical principles jointly, not by merely memorization of formulas.
- ◆ have abilities to apply theory of mechanics to analyse and solve practical engineering problems in a logical manner.

Course Description: Force system, Forces in plane and space, Resultants and equilibrium of structures and machines, Centre of gravity, Trusses, frames and machines, Beams, Friction, Principle of virtual work, Moment of inertia.

SESSION**TOPIC****CHAPTER 1 GENERAL PRINCIPLES**

1. Mechanics, Fundamental Concepts, Units of Measurement, The International System of Units, Numerical Calculations, General Procedure for Analysis

CHAPTER 2 FORCE VECTORS

- 2-3 Scalars and Vectors, Vector Operations, Vector Addition of Forces, Addition of a System of Coplanar Forces, Cartesian Vectors, Addition and Subtraction of Cartesian Vectors, Position Vectors, Force Vector Directed Along a Line, Dot Product

CHAPTER 3 EQUILIBRIUM OF A PARTICLE

- 4-5 Condition for the Equilibrium of a Particle, The Free-Body Diagram (FBD), Coplanar Force Systems (two dimensions), Three-Dimensional Force Systems

CHAPTER 4 FORCE SYSTEM RESULTANTS

- 6-7 Moment of a Force – Scalar Formulation, Cross Product, Moment of a Force – Vector Formulation, Principle of Moments, Moment of a Force About a Specified Axis, Moment of a couple (torque), Resultant of a Force and Couple System, Further Reduction of a Force and Couple System

CHAPTER 5 EQUILIBRIUM OF A RIGID BODY

- 8-10 Conditions for Rigid-Body Equilibrium, Equilibrium in Two Dimensions, Free-Body Diagrams, Equations of Equilibrium, Two- and Three-Force Members, Equilibrium in Three Dimension, Free-Body Diagrams, Equations of Equilibrium, Constraints for a Rigid Body

CHAPTER 9 CENTRE OF GRAVITY AND CENTROID

- 11-13 Centre of Gravity and Centre of Mass for a System of Particles, Centre of Gravity, Centre of Mass and Centroid for a Body, Composite Bodies

CHAPTER 10 MOMENTS OF INERTIA

14-16 Definition of Moment of Inertia for Areas, Parallel-Axis Theorem for an Area, Radius of gyration of an Area, Moments of Inertia for an Area by Integration, Moments of Inertia for Composite Areas

CHAPTER 6 STRUCTURAL ANALYSIS

17-19 Simple Trusses, Method of Joints, Zero-Force Members, The Method of Sections, Frames and Machines

CHAPTER 7 INTERNAL FORCES

20-22 Internal Forces Developed in Structural Members, Shear and Moment Equations and Diagrams, Relations Between Distributed Load, Shear, and Moment

CHAPTER 8 FRICTION

20-25 Characteristics of Dry Friction, Problems involving Dry Frictions

CHAPTER 11 VIRTUAL WORK

26-28 Definition of Work and Virtual Work, Principle of Virtual Work for a Particle and a Rigid Body, Principle of Virtual Work for a System of Connected Rigid Body

EXAMINATION:

Mid-term Examination (*Chapter 1-5*) Sun **October 2, 2016** (14.30-16.30, 2 hrs)

Final Examination (*Chapter 6-11*) Tue **December 7, 2016** (13.00-16.00, 3 hrs)

MAIN TEXTBOOK:

- ◆ Hibbeler, R.C. "Engineering Mechanics" SI Edition., Pearson/Prentice Hall, Singapore.

REFERENCES:

- ◆ Beer, F.P. and Johnston, E.R., "Vector Mechanics for Engineers – Statics", SI Metric Edition, McGraw-Hill Book Company, Singapore.
- ◆ Jong, I.C. and Rogers, B.G., "Engineering Mechanics - Statics" Saunder College Publishing, USA.
- ◆ Riley, W.F. and Sturges, L.D., "Engineering Mechanics - Statics" Saunder John Wiley & Sons, Inc., USA.
- ◆ Any books related to "Engineering Mechanics - Statics"

GRADING POLICY:-

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| ◆ Homework/Assignment | 5% |
| ◆ Pop Quiz and Class attendance | 5% |
| ◆ Mid-tem examination (Ch.1 to Ch.5) | 35% |
| ◆ Final examination (Ch. 6 to Ch. 11) | 55% |

หมายเหตุ

- 1) การตัดเกรด เป็นการตัดเกรดรวมโดยอาจารย์ผู้สอนทุกท่าน
- 2) นักศึกษาที่ได้คะแนนรวมโดยประมาณน้อยกว่า ร้อยละ 40 อาจถูกพิจารณาได้เกรด F
- 3) นักศึกษาต้องเรียนตาม section ที่ลงทะเบียน เว้นแต่จะได้รับอนุญาตจากอาจารย์ผู้สอน มิฉะนั้นจะถือว่าคะแนนเก็บเป็นศูนย์