Elaborate Course: Architectural Mechanics

精品课程：建筑力学

(Credits: 3; Credit Hours: 48; Laboratory Hours: 0)

1. The nature and objectives of the course

Architectural Mechanics is a mandatory and disciplinary fundamental course of the major of architectural engineering. The objectives of the course primarily include (a) establishing the mechanical knowledge-base and structure serving as the fundamentals of modern engineering technology, (b) developing students' analytical and problem-solving capabilities via revealing the origin, development and maturing process of subjects such as strength, stiffness and stability of prismatic members, and (c) laying the important mechanical foundation for subsequent mechanical courses and scientific research activities.

2. Training expectations of students' capabilities

Upon completion of the course lectures, students are expected to achieve

(1) Analytical capability: (a) deterministic knowledge of the fundamental concepts and methodologies typically employed in mechanics of materials and (b) the elementary skills of abstracting rational mechanical model from engineering practical problems and constructing free body diagrams for subsequent analysis;

(2) Calculation capability: (a) decent calculation proficiency on stress, strain, deformation, strength, stiffness and stability;

(3) Laboratory Capability: (a) accurate awareness on the fundamental mechanical properties of common engineering materials, (b) the elementary skills for measuring fundamental mechanical properties of materials under the guideline of national measurement standards, (c) the acquaintance on the methodology and principle of electrical measurements, and (d) hands-on experiences on the determination of bending stresses of structures using the method of electrical measurements;

(4) Self-learning capability: (a) the capability of comprehending, analyzing and summarizing the knowledge system that have been offered and (b) the necessary skills to actively search and study references about a given subject matter;

(5) Communication capability: necessary capabilities of presenting homework and exam solutions in a comprehensive, neat and well-organized manner;

(6) Innovation capability: (a) a rewarding habit of independent thinking and thorough investigation focusing on a given topic, (b) the capability to come up with multiple solutions or methodologies, and (c) the ability to simplify, complicate or evolve a given problem.

3. Tentative allocation of teaching hours

Course Content	Hours (48)
Introduction	3
Statics of Particles	3
Equilibrium and Simplification of a Force System	3
Statics of Rigid Bodies	3
Analysis of Trusses and Frames	3
Axial Loading & Shear	3
Torsion	3
Bending Internal Forces, Stresses and Deflections	3
Statically Indeterminate Bars	3
Stress Analyses & Strength Theory	3
Combined Loading	3
Stability of Columns	3
Energy Methods	3
Displacements of Determinate Structures	3
Internal Forces in Indeterminate Structures	3
Influence Line and Contour Diagram of Internal Forces	3

4. Grading policy

Final Grade = Routine Performance (including attendance, homework evaluation, classroom discussion and quizzes) + Final Exam

Routine Performance: 40％

Final Exam: 60％

5. Textbook & references

(1) Vector Mechanics for Engineers: Statics and Dynamics, F.P. Beer, E.R. Johnston, D.F. Mazurek, P.J. Cornwell, and E.R. Eisenberg, 9th Ed., 2010, McGraw Hill (ISBN: 978-0-07-352940-0)

(2) Mechanics of Materials, F.P. Beer, E.R. Johnston, J.T. Dewolf, and D.F. Mazurek, 6th Ed., 2012, McGraw Hill (ISBN: 978-0-07-338028-5)

(3) Structural Mechanics, S.H. Bao and Y.Q. Gong, Wuhan University of Technology Press, 2007.

6. More information can be found at

(1) http://civil.seu.edu.cn/mi/am/list.htm

(2) http://civil.seu.edu.cn/mi/experiment/list.htm