



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

<p>STATICS PHS 4570 3 Credit Hours</p>
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Student Level:

This course is open to students on the college level in either the freshman or sophomore year.

Catalog Description:

PHS4570 - STATICS (3 hrs)

The vector study of the composition and resolution of forces, equilibrium of force systems, friction, gravity, moment of inertia, and virtual work.

Prerequisite: C grade or better in MTH4440 Calculus II and PHS4560 Engineering Physics I

Controlling Purpose:

This course is designed for those students entering the engineering and science fields.

Learner Outcomes:

The student will acquire the ability to analyze a mechanical system, that is, to identify the forces present in a mechanical system and to apply mathematical principles (including those of vector algebra and of calculus) and physical laws to the solution of problems involving that system.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.

- F = Failing, will be computed in GPA and hours attempted.
 N = No instruction or training in this area.

CHAPTER 2: STATICS OF PARTICLES						
Outcomes: Acquire knowledge and understanding of Statics of Particles						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate the force on a particle by resultant of two forces.
						Understand and apply vectors and addition of vectors to systems of particles.
						Evaluate systems by force vector addition and free-body diagrams.
						Evaluate systems by concurrent force addition and define equilibrium in space.

CHAPTER 3: RIGID BODIES: EQUIVALENT SYSTEMS OF FORCES

Outcomes: Acquire knowledge and understanding of Rigid body Analysis

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate systems by Principle of transmissibility.
						Understand and apply vector products.
						Evaluate moments of force about a point.
						Understand and apply Varignon's theorem.
						Apply Scalar products of two vectors.
						Evaluate mixed triple product of vectors
						Moment of force about an axis and a couple.
						Addition of couples
						Resolution and reduction of forces to couples.
						Equivalent systems of forces.

CHAPTER 4: EQUILIBRIUM OF RIGID BODIES

Outcomes: Acquire knowledge and an understanding of Rigid Body Equilibrium

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Apply free body diagrams to problems.
						Evaluate reactions at supports and connections.
						Evaluate two and three dimensional equilibrium.
						Evaluate Statically indeterminate reactions.
						Evaluate the equilibrium of two and three force bodies.

CHAPTER 5: DISTRIBUTED FORCES: CENTROIDS AND CENTERS OF GRAVITY

Outcomes: Acquire knowledge and an understanding of distributed forces about Centroids of gravity

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate the center of gravity of two and three dimensional bodies.
						Determine centroids of lines, areas and volumes.
						Evaluate First Moments of areas and lines.
						Integration of centroids.
						Evaluation of the theorems of Pappus-Guldinus.
						Evaluate composite bodies.

CHAPTER 6: ANALYSIS OF STRUCTURES

Outcomes: Acquire knowledge and an understanding of forces in Beams

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate various loading and support systems for beams.
						Evaluate internal forces in beams.
						Assess and solve applications of shear and bending moments by diagram.
						Compare relations and assess systems between load, shear and bending moment.
						Evaluate cables with concentrated and distributed loads.
						Evaluate load and reaction conditions of structures.

CHAPTER 7: FORCES IN BEAMS AND CABLES

Outcomes: Acquire a knowledge and understanding of Friction

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Understand and apply the Laws of dry friction and the coefficient of friction.
						Evaluate and solve applications of dry, angular and wedge type friction.
						Evaluate journal, thrust and wheel friction.

CHAPTER 8: FRICTION

Outcomes: Acquire knowledge and an understanding of forces in Beams

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate various loading and support systems for beams.
						Evaluate internal forces in beams.
						Assess and solve applications of shear and bending moments by diagram.
						Compare relations and assess systems between load, shear and bending moment.
						Evaluate cables with concentrated and distributed loads.

CHAPTER 9: DISTRIBUTED FORCES: MOMENTS OF INERTIA

Outcomes: Acquire knowledge of distributed forces in Moments of Inertia

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Evaluate Moments of Inertia (second moment) of area.
						Determine moments by integration.
						Determine the Polar moment of inertia.
						Evaluate the Radius of Gyration of an area
						Understand and apply the Parallel Axis Theorem.
						Evaluate Moments of composite areas and masses.
						Evaluate masses for moment of inertia by the Parallel Axis Theorem.
						Determine the moment of inertia of three dimensional body by integration.

Projects Required:

None

Text Book:

Contact the bookstore for current textbook.

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Time Frame:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time, The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.