

**SYLLABUS: EGN 2130 Analytical Mechanics - Statics FALL 2009**

SEMESTER HOURS: 3 ( 3 Lecture Hours per Week)  
 INSTRUCTOR: Dr. George Saum Office AS 16 (East) 573-518-2174  
 Office Hours: 12:00 MTWF 10:00 R  
 SCIENCE DEPT CHAIR: MR. Scheidt AS 212B 573-518-2314

CLASS TIME: MWF 8:00 - 8:50 AM

COURSE DESCRIPTION: Application of principles of Mechanics to problems of equilibrium.  
 Topics include resultant forces, equilibrium, center of gravity, moment of inertia.

PREREQUISITE: PHYSICS 2230 and MATH 2150  
 TEXT: ENGINEERING MECHANICS- STATICS 12th Edition, by R.C. Hibbeler, 2010  
 Pearson Prentice Hall  
 ISBN 978-0-13-607790-9

EVALUATION OF STUDENTS:

TESTS	80 %
HOMEWORK	20%

COURSE OUTLINE: Approx. Class Periods

CHAP 1	Introduction	1
CHAP 2	Force Vectors Scalars and Vectors Vector Operations Vector Addition of Forces Addition of a System of Forces Cartesian Vectors Addition and Subtraction of Vectors Position Vectors Force Vector Along a Line Dot Product	1
CHAP 3	Equilibrium of a Particle Condition of Equilibrium of a Particle The free body Diagram Coplanar Force Systems Three-Dimensional Force Systems	2
CHAP 4	Force Resultant Systems Moment of a Force - Scalar Formulation Moment of Force- Vector Formulation Principle of Moments Moment of force about Specific Axis Moment of a Couple Equivalent Systems Resultant of a Force and a Couple System Reduction of a Force and Couple System Reduction of Simple Distributed Loading	4
CHAP 5	Equilibrium of a Rigid Body Conditions for Rigid Body Equilibrium Free Body Diagrams 2-D Equations of Equilibrium 3-D Two and Three Member Forces Free Body Diagram 3-D Equations for Equilibrium 3-D Constraints of a Rigid Body	4

CHAP 6	Structural Analysis Simple Trusses Method of Joints Zero-Force Members Method of Sections Space Trusses Frames and Machines	5
CHAP 7	Internal Forces in Structural Members Shear and Moment Equations and Diagrams Relations Between Distributed Load, Shear, and Moment Cables	4
CHAP 8	Friction Characteristics of Dry Friction Problems Involving Dry Friction Wedges Frictional Forces on Screws Frictional Forces on Belts Frictional Forces on Collar Bearings and Disks Frictional Forces on Journal Bearings Rolling Resistance	3
CHAP 9	Center of Gravity and Centroid Center of Gravity and Center of Mass of System Center of Mass and Centroid of Body Composite Bodies	3
	Theorem of Pappus and Guldinus Resultant of a General Distributed Load Fluid Pressure	2
CHAP 10	Moment of Inertia Definition of Moment of Inertia Parallel Axis Theorem for an Area Radius of Gyration for an Area Moment of Inertia for an Area by Integration Moment of Inertia for Composite Areas Product of Inertia for an Area Moment of Inertia for an Area About an Inclined Axis Mass Moment of Inertia	7

**SPECIAL NEEDS:**

If you have special needs as addressed by the Americans with Disabilities Act and need any test or course materials provided in an alternative format, notify your instructor immediately. Reasonable efforts will be made to accommodate your special needs. Special Needs Services is located in AS 103, 518-2152. If you are a handicapped person and cannot attend the on-site examinations, please contact the instructor to make special arrangements.

**MAC's Policy for Disciplinary Action**

"...College discipline shall be exercised when student misconduct adversely affects the college's pursuit of its educational objectives. Misconduct for which students are subject is defined as follows: Dishonesty, such as cheating, plagiarism, or knowingly furnishing false information to the college" (Mineral Area College Board Policy Manual, section 5.72, IA., p. 99).

**Attendance:**

Disciplined attendance is strongly encouraged.  
School policy prohibits a total of more absences than two equivalent classroom weeks.  
Poor attendance will severely impact your classroom performance.

**EGN 2130 - STATICS - FALL 2009**

Date	TOPIC	SECTIONS	HOMEWORK PROBLEMS	Corrections	
Aug	17	Introduction, Vectors	1.1-6, 2.1-9	2 – 33,49,70,91,95	
	19	Particle Equilibrium -2D	3.1-3	3 – 3,15,19,23	
	21	Particle Equilibrium -3D	3.4	3 – 49,51,57,58	
	24	Moment of Force, Cross Product	4.1-4	4 – 5,11,39,42	
	26	Moment about a Line, Couple	4.5-6	4 – 51,61,75,93	
	28	Equivalent Systems	4.7-8	4 – 109,114,117	
Sept	31	Equivalent Systems, Dist. Loads	4.9 - 4.10	4 – 125,130,134	
	2	Distributed Loads	4.10	4 – 143,146,158	
	4	Rigid Body Equilibrium – 2D	5.1-3	5 – 13,14,22,29	
	7	<b>LABOR DAY</b>			
	8	Review Chap 3 & 4		3 – 45,75 4-123,162,167	
	10	<b>FIRST TEST</b>			
	14	Rigid Body Equilibrium – 2D	5.1-4	5 – 30,33,41,43	
	16	Rigid Body Equilibrium – 3D	5.5-7	5 - 63,66,70,74	$A_z = -50\text{lb}$
	18	Rigid Body Equilibrium - 3D	5.5-7	5 – 79,81,82,83	
	21	Trusses	6.1-3	6 – 2,6,9,24	
	23	Trusses	6.4	6 - 33,34,37,41	
	25	Trusses	6.4	6 – 45,47,49,53	
	28	Frames and Machines	6.6	6 – 67,70,73,75	
	30	Frames and Machines	6.6	6 – 78,83,90,93	
Oct	2	Frames and Machines	6.6	6 – 103,105,106,119	
	5	Review Ch 5 and 6		5-43, 6-129, 6-132	
	7	<b>SECOND TEST</b>			
	9	Internal Forces	7.1	7-1,3,10,15	
	12	Shear and Moment Eqns.	7.2	7-43,47,54,57	
	14	Shear and Moment Eqns.	7.3	7-67,69,75,77	
	16	Shear and Moment Eqns.	7.3	7-79,81,83,87	
	19	Friction	8.1-2	8-2,6,9,17	$\text{Tan } \theta = 5 \mu$
	21	Friction, Wedges	8.3	8-65,66,67,71	$P=858\text{N}, P=453\text{N}$
	24	Belt Friction	8.5	8-89,91,97,105	
	26	Review Ch 7-8			
	28	<b>THIRD TEST</b>			
	30	Centroid of Composite Bodies	9.1	9-1,7,9,23	
Nov	2	Centroid of Composite Bodies	9.2	9-46,54,55,65	
	4	Theorem of Pappus, Guldinus	9.3	9-85,90,95,101	
	6	<b>FALL BREAK</b>			
	9	Distributed Loads, Fluid Pressure	9.4-5	9-105,109,115,119	
	11	Moments of Inertia by Integration	10.1-3	10-1,5,6	
	13	Moments of Inertia by Integration	10.1-3	10-9,10,19,22	$\text{Use } \cos^2\theta = 1-\sin^2\theta$
	17	Moment of Inertia-Composites	10.4	10-30,33,34,41	$1.206 \times 10^8 \text{ mm}^4$
	19	Moment of Inertia-Composites	10.4	10-43,50,51,59	
	21	<b>THANKSGIVING</b>			
	23	Product of Inertia	10.5	10-61,62,65,66	
	26	Principal Moment of Inertia	10.6	10-70,73,74	
	38	Principal Moment of Inertia	10.6	10-79,81,82	
	30	Mass Moment of Inertia	10.8	10-94,95,97	$(93/70)\text{mb}^2$
Dec	2	Mass Moment of Inertia	10.8	10-105,107,111	
	4	Review CH 9,10		9-125, 10-115,116	
	11	<b>FINALS 8:00 AM</b>			