**I. COURSE TITLE:** Mechanisms

**COURSE NUMBER:** 2204 **CATALOG PREFIX:** ENDS

**II. PREREQUISITE(S):** ENDS 2201 Engineering Mechanics: Statics

**III. CREDIT HOURS:** 3 **LECTURE HOURS:** 2

**LABORATORY HOURS:** 1 (2 Contact) **OBSERVATION HOURS:** 0

**IV. COURSE DESCRIPTION:**

A study of mechanical components including: gear trains; belt, chain, and

disk drives; cams, levers, linkage mechanisms, and Geneva mechanisms.

Laboratory work complementing class work.

**V. ADOPTED TEXT(S):**

ANALYSIS AND DESIGN OF MECHANISMS

2nd edition

Deane Lent

Prentice Hall

ISBN: 0-13-032797-2

**VI. COURSE OBJECTIVES:**

Given the equipment necessary to create and assemble a variety of mechanisms, the student will:

1. Analyze the mechanical advantage of the mechanism.

2. Indicate typical applications of mechanism.

3. Calculate the mechanism forces.

4. Complete a technical report on the mechanism.

5. Research technical data from technical handbooks and product catalogs.

6. Learn the basic principles of displacement, velocity, and acceleration, becoming better prepared to design and analyze any mechanism kinematically.

The student will also enhance their understanding of several classic mechanisms.

**VII. COURSE METHODOLOGY:**

May include but not limited to Lecture and Problem Solving, independent

and group projects, in-class and home assignments, quizzes, reports and tests.

Problem solving will use both graphical and mathematical methods.

Attendance is required.

**VIII. GRADING**

A = 90 – 100

B = 80 – 89

C = 70 – 79

D = 60 – 69

F = 0 – 59

See college catalog for description of other possible grades.

**IX. COURSE OUTLINE:**

WEEK: MATERIAL:

1. Introduction, Techniques, Drafting Precision, Measurements

Classes of motion in a plane Chapter 1

1. Displacement, linear and angular displacement

Paths of points on moving bodies Chapter 2

3. Mechanisms producing specific paths

Straight-line Mechanisms

1. Mechanism to describe arcs

Test one

1. The design of linkages to describe a given path

Linear Velocity Chapter 3

1. Vector representation of linear velocities

Angular Velocity

1. Relationship between linear and angular velocity

Rolling Contact, Sliding Contact

1. Determining the velocity

Test two

1. Linear Acceleration Chapter 4

Uniform and Variable linear acceleration

10. Angular Acceleration

Uniform and Variable angular acceleration

11. Graphical Analysis of Motion Chapter 5

Graphical Calculus, integration, differentiation, step method

12. Test three

Gearing, Speed Ratio Chapter 6

13. Gear Trains, Speed Ratio, Idler Gears, Chapter 7

Direction of Rotation

14. Linkages, Basic four-bar linkage, Cranks, Sliders Chapter 8

Quick-return Linkage, Velocity, Cam Design Chapter 9

15. Mechanisms, crank and rocker, drag link, straight line mechanism,

Pantograph, Scotch yoke, Geneva Mechanism, pawl and ratchet

Week 16: Final Exam

**X. OTHER REQUIRED TEXTS, SOFTWARE, AND MATERIALS:**

Scientific calculator

Scale and Protractor

Graphing paper (1/4" squares)

A 3-ring binder for keeping correct solution of assigned problems.

Paper for solution of problems pre-printed with outline will be provided.

Student will need an auxiliary storage device, flash drive or network

home-drive.

**XI. EVALUATION:**

Assignments count – 30% of Final Grade

Attendance counts – 10% of Final Grade

(3) Tests count – 40% of Final Grade

Final counts – 20% of Final Grade

Note well:

Class participation- it is your class, and your participation improves it.

Class attendance- text covers 50% of material, in-class the other 50%.

Evaluation:

Development of ability to analyze mechanics problems and present the results. The retention of general information, data handling skills, and increased speed and accuracy.

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

* + All assignments and tests must be turned in on time.
  + Students may work on their own time to complete the assignments. Some group work is encouraged on exercises and assignments.
  + Assignments must be in 3-ring binder.
  + Examinations will include written and graphical components.
  + For credit, all assignments will be completed as scheduled.
  + No test may be taken late without prior approval of instructor.
  + No make-up tests. Read your student handbook.

**XIII. OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes.

Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities

Service Office, Central Campus, at 800-628-7722 or 937-393-3431.