PHYS 5101-001
Forces and Motion
Summer 2006

Instructors:

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Course Description: This course will introduce the basic concepts of motion and the forces that cause motion to change using daily hands-on activities, including identifying patterns by collecting/graphing/analyzing data and applying concepts to everyday phenomena. This course is not applicable towards any degree in Physics.

Meeting Dates and Times: This course will meet from 8:30 a.m. to 4:30 p.m. with approximately 45 minutes for lunch on the following dates:

Week 1: June 5 - 9 Week 2: June 12 - 16

Attendance: is mandatory due to the intense nature of the course. Any time missed will have to be made up by arranging with the instructors. More than one day missed brings forfeiture of stipend and credit.

Credit: Four hours of College of Liberal Arts and Sciences graduate credit from the University of Colorado, Denver, will be awarded upon successful completion of the course. Registration for the course and payment of the $300 tuition is mandatory.

Stipends: A $1500 stipend will be awarded to RM-MSMSP partner district participants upon successful completion of the course. An additional $1500 will be awarded when the corresponding Structured Follow-Up is completed in the fall. Only partner district participants are eligible for stipends.

Assignments and Grading:

Grades: Your course grade will be based on: 1] A portfolio/documentation of your semesters work (worth 30% of your grade), 2] A graded set of assessments, assignments, activities, and homework (worth 55% of your grade), and 3] A final test (worth 15% of your grade). Grades will be based on a straight 90, 80, 70, 60 scale.

Requirements:

Portfolio/Documentation: A portfolio containing a detailed record of your work is required. The portfolio must contain all class notes, handouts, assessments, assignments,

and homework with annotations specifically addressing how you intend to use, or modify these materials for use, in your classes. The portfolio is worth 30% of your grade.

Assessments/Assignments/Activities/Homework: You will be required to design detailed grade-level specific physics activities using learning cycles, for use in your own classes, periodically throughout the course. You will, also, be required to carryout assigned physics activities and hand in homework periodically during the semester. Occasional assessment activities (quizzes!) will be given during the semester. These assessments, assignments, activities, and homework will be graded and constitute 55% of your total grade.

Final: There will be a final worth 15% of your grade at the end of the semester.

Materials & Supplies: You will be provided a set of handouts and worksheets on topics and activities to be covered in the course. You will receive a 3-ring binder to keep your materials in. Blank copies of these materials will be provided in PDF and DOC format on a CD. Two conceptual level physics books, i.e. "Stop Faking It: Force and Motion" and "Stop Faking It: Work and Energy" (NSTA) to be used for classroom discussion and homework will be provided.

Bring: Notebook paper, pencil, calculator (scientific calculator with sin, cos, etc. costing about $10 – 15), graph paper, and a clear plastic ruler.

Innovation Project: One of the requirements for successful completion of the fall Structured Follow Up course is implementation of an Innovation Project. Each RM-MSMSP course has its own Innovation Project requirements. In this course, you will work with colleagues in the course to complete a Lesson Study. A mentor teacher will visit your classroom as you implement the lesson study. Your lesson study team will produce a final product that includes details about your lesson, student work, and analysis of student assessment data. More information about the Innovation Project will be provided as the course progresses, but one of the requirements for successful completion of this course is to turn in an outline of your Innovation Project.

Schedule of Topics Covered

1. Pedagogy
    a. Learning Cycles in Physics Instruction
        i. Engage
        ii. Explore
        iii. Explain
        iv. Elaborate
        v. Evaluate
2. Physics Topics
    a. Forces
        i. Balanced Forces
        ii. Unbalanced Forces
    b. Motion
        i. Changing Motion
        ii. Constant Motion
    c. Energy
        i. Kinetic
        ii. Potential
        iii. Conservation of Mechanical Energy
    d. Momentum
        i. Momentum in One Dimension
        ii. Conservation of Momentum