ST. PETERSBURG COLLEGE

COLLEGE OF EDUCATION

*"Preparing students to serve as effective, reflective and caring teachers."*

COURSE SYLLABUS

*This syllabus course calendar and other attending documents are subject to change during the semester in the event of extenuating circumstances.*

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| **Course Prefix:** | SCE 3420C Semester 505 |
| **Section #:** | 3845 |
| **Credit Hours:** | 4 |
| **Co-requisites:** |  |
| **Pre-requisites:** | CHM 1025 |

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| **Day, Time and Campus:** | TBD | Enter Time | | Choose an item. |
| **Modality:** | Online | | | |
| **Professor:** | Ann McNicol | | | |
| **Office Hours:** | By appointment in Evenings | | Click here to enter text. | |
| **Office Location:** | Clearwater NM 111 | | Click here to enter text. | |
| **Office Phone:** | 727 599-4308 (cell phone – please leave message if no answer) | | | |
| **Email Address:** | Mcnicol.ann@spcollege.edu | | | |

**ACADEMIC DEPARTMENT: College of Education**

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| **Dean:** | Kimberly Hartman, Ph.D. | |
| **Office Location & Number:** | Tarpon Springs | BB 101 |

1. **COURSE DESCRIPTION**

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| This course is a study of the fundamental concepts of physical science as part of preparation for teaching science in grades 5-9. General topics will include: Newtonian mechanics, force, motion, energy, momentum, magnetism, electricity, light, sound and gravity. Chemistry topics will include the nature of elements, compounds, and mixtures; chemical and physical properties of matter; chemical reactions and nuclear processes. Although knowledge of basic algebra and mathematical skills are required, the course is focused on the conceptual understanding of physical principles rather than on mathematical manipulations. An integrated laboratory component will stress the importance of evidence, observations, experimentation, logic, and argument, and provide students with the knowledge and skills necessary for conducting demonstrations and laboratory investigations in the middle school setting. This course is designed for majors in the Middle School General Science, 5-9 program, and addresses specific Sunshine State Standards, subject matter competencies and pedagogy pertinent to the discipline and required for certification. 92 contact hours. |

1. **MAJOR LEARNING OUTCOMES**

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| **1. The student will demonstrate an understanding of Newton's laws and related concepts and will apply these in appropriate situations by:**  a. differentiating between mass and weight and using theses quantities in problem solving.  b. solving problems using Newton's Laws.  c. incorporating friction forces into a system of forces in applying Newton's Laws.  d. distinguishing between vector and scalar quantities.  e. defining relevant terms including : force, mass, inertia, energy, friction, momentum, torque, conservation of momentum and energy, pressure.  **2. The student will demonstrate an understanding of energy and momentum and will apply these concepts by describing the behavior of systems of particles by:**  a. solving problems involving work, energy, and power, including the conservation of energy principle, in which one form of energy decreases while another form increases and using the concept of conservation.  b. solving problems involving gravity, potential and kinetic energy, and work done by applied forces.  **3. The student will demonstrate an understanding of the concepts of electrostatics and electrodynamics and the applications of these concepts by:**  a. applying the principles of a galvanometer, voltmeter and ammeter.  b. defining induced electromotive force (emf) and magnetic flux.  **4. The student will demonstrate an understanding of, and be able to use, concepts of magnetism and the relation between magnetism and electrodynamics by:**  a. defining the magnetic field in terms of the force on a moving charge or in terms of current.  b. identifying characteristics of magnetic fields in relation to the earth and to elements that generate magnetic fields.  **5. The student will demonstrate an understanding of light and optics by:**  a. defining the basic concepts to sound and wave behavior.  b. working application problems involving concave and convex lens systems.  **6. The student will demonstrate an understanding of the heat and principles of thermodynamics by:**  a. relating and comparing the enthalpy changes of reactions and physical processes.  b. applying the First Law of Thermodynamics to identify and measure internal energy change and heat flow.  c. distinguishing between heat and temperature.  **7. The student will demonstrate an understanding of the observable macroscopic properties of matter by:**  a. measuring density and specific heat of selected representative elements.  b. relating state of matter to the kinetic theory at the atomic level.  c. defining and solving problems dealing with the density and specific gravity of solids, liquids, and gases.  d. defining the Bernoulli principle.  **8. The student will demonstrate an understanding of the classification of matter by:**  a. defining such terms as metals, nonmetals, molecular and ionic compounds, alloys, solutions, and heterogeneous and homogenous mixtures.  b. identifying characteristics of pure substances  **9. The student will demonstrate an understanding of the periodic table and how the periodic table is used by:**  a. using the Periodic Table to identify metals, nonmetals, and metalloids; and between "A" group and transition elements, and to write the symbol for ions.  b. identifying elements that lose elections, elements that gain electrons, and elements that share elections in specific compounds and molecules.  c. relating the number of protons, and electrons in an atom to its an ion’s charge.  d. writing a chemical equation to correctly describe observed reactions, and demonstrating an understanding of the conservation of matter.  **10. The student will demonstrate an understanding of chemical bonding and properties of molecular and ionic compounds by:**  a. identifying characteristics of ionic compounds.  b. identifying characteristics of molecular compounds.  c. identifying the characteristics of organic compounds.  **11. The student will demonstrate an understanding of chemical nomenclature and of chemical equations by:**  a. interpreting chemical symbols and formulae names.  b. writing appropriate chemical equations.  **12. The student will demonstrate an understanding of radioactive decay by:**  a. defining the following terms; radioactive decay, fission and fusion, half life.  b. writing representative nuclear equations for alpha, beta and gamma decay.  c. solving half life problems.  **13. The student will apply the scientific method to the study of physical phenomena by:**  a. demonstrating the ability to use the tools of measurement as applied to distance, time, mass and temperature.  b. utilizing the techniques of collecting and analyzing experimental data, including mathematical, graphic and statistical analysis.  c. reporting results concisely from the data obtained.  d. communicating in writing the results and conclusions of experiments. |

1. **REQUIRED TEXTBOOK(S), RESOURCES AND MATERIALS**

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| Textbook(s) | Required: Conceptual Physical Science with Mastering Physics, 5/E . Package 9780321804181 |
| Recommended: Physics Fundamentals and problem Solving . Dan Fullerton 2012 (this is an Ibook available as an Ibook from Apple |

1. **Supplemental Material**

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| Resources: www.masteringphysics.com | |
| Materials: | |
| Library: | <http://www.spcollege.edu/libraries/> |

1. **Technology**

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| Technology is an essential tool for receiving and developing instruction. Students are expected to reference MYCOURSES continuously to assure all current content for class has been accessed. Additionally students are expected to be familiar or familiarize themselves with PowerPoint presentation methods.  The instructor of this course frequently uses smart boards, ELMOs, power point, digital media, and web based resources to disseminate information and engage pre service learners and students. |
| All work must be submitted in a format compatible with Microsoft Word (e.g.: .doc, .docx, .rtf) |

1. **Supplies**

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| Ruler, meter stick (both metric), String, tape, one lemon (for one of the lab experiments). Modern computer to run simulations and Vernier software |

1. **COURSE REQUIREMENTS & EXPECTATIONS**

*Class expectations: This class serves students who are working teachers, students in the 4 year bachelor program, and students in the educator preparatory program. The course is a “C” (laboratory) class. Expect to spend a minimum of 4 hours a week on course content material, and an additional 3 hour block of time to do the weekly experiment (with written lab report). Expect that each week you will have a textbook reading, an online exercise on the Pearson Mastering Physics site, and a laboratory investigation to conduct. It is your responsibility to do the exercises, to conduct the laboratory investigations, and to submit laboratory reports.*

1. **School Based Hours Course Requirements**

This course requires 0 hours of observation/participation in an appropriate classroom setting as approved by the Office of School Partnerships.

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| None |

1. **ALL Course Assignments**

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| Mastering physics online assignments: 150 points (15 at 10 points each)  Laboratory reports : 130 points (13 at 10 points each)  Progressive exams: 300 points (3 at 100 points each)  **Final Exam 200 points** |
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**\* Assignments labeled with an (\*) denote required assignments that must be passed at 75%.**

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| ***UCC Assignments:*** *Teacher candidates must demonstrate UCC competencies and earn a ‘C or above (at least 75%)’ on all UCC assignments [FEAP, ESOL, FSAC, Reading Competencies (RC), and Additional Element] in order to successfully pass the course.*  ***FEAP Assignment Rubrics:*** *In addition to a ‘C or above’, a teacher candidate must also earn a ‘minimum’ score on the line item of the rubric for assignments aligned to FEAP standards. For example, a 3 (Progressing) or 4 (Target) is required in courses prior to final internship and a 4 (Target) is required for final internship in order to successfully pass the course.*  *If the teacher candidate has not successfully demonstrated the UCC competency as stated above, he/she may have an opportunity (within the term) to work with the instructor to improve the understanding of the concept. The assignment must then be corrected and resubmitted, and will not receive a grade higher than a C.  In the event of cheating or plagiarizing, see BOT Rule 6Hx23-4.72 for consequences.*  *Teacher candidates must upload into Chalk & Wire all FEAP, ESOL, and RC assignments (identified as Critical Reading Tasks) as denoted in the Uniform Core Curriculum Assessments table above.* |

1. **SYLLABUS STATEMENTS COMMON TO ALL COE SYLLABI**
2. **COE SYLLABUS STATEMENTS**

<https://docs.google.com/document/d/1VrvFtlW9RPl2YgbSrHdstAkktd-BtneMQuttI5khNzQ/edit?usp=sharing>

1. **SPC Syllabus Statements**

<http://www.spcollege.edu/addendum/>

***Each student must read all topics within this syllabus and the content of the links.  If the student needs clarification on any items in the syllabus or linked statements, he/she should contact the course instructor.***

***If you remain enrolled after the drop date (8/21/2015) this signifies that you agree to abide fully by the parameters set in this syllabus and any syllabus addendum. Dropping after 10/22/2015 will result in a “F” being awarded.***

1. **CALENDAR AND TOPICAL OUTLINE**

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| |  |  | | --- | --- | | Week 1  8/17-8/23 | Patterns of Motion and Equilibrium (chapter 1)  Week 1 discussion posting  Two Mastering Physics online assignments due (introduction and chapter 1) | | Week 2  8/24-8/30 | Newton’s Laws of Motion (chapter 2)  Mastering physics online assignment for chapter 2  Laboratory activity: graphing linier Motion | | Week 3  8/31-9/6 | Momentum and Energy (chapter 3)  Mastering physics Online assignment for chapter 3  Online virtual lab (Phet collisions) lab | | Week 4  9/7-9/13 | Gravity, Projectiles and Satellites (Chapter 4)  Mastering physics online assignment  Vernier motion lab due (You MUST have picked up your equipment box to due this lab) | | Week 5  9/14-9/20 | Fluid Mechanics (chapter 5) (***At this point, please not that the labs will vary from the week topic – many will be used to review previous topics from the class)***  Mastering physics online assignment  Density Lab  First online Exam | | Week 6  9/21-9/27 | Thermal Energy and Thermodynamics (Chapter 6)  Mastering Physics assignment  Buoyancy lab  Discussion Forum #2 | | Week 7  9/28-10/4 | Heat Transfer and Change of Phase (Chapter 7)  Mastering Physics assignment  Heat of Fusion Vernier Lab | | Week 8  10/5-10/11 | Static and Current Electricity (chapter 8)  Mastering physics assignment  Lemon Juice Battery lab | | Week 9  10/12-10/18 | Magnetism and Electromagnetic induction (chapter 9)  Mastering physics assignment  First class Lever Lab | | Week 10  10/19-10/25 | Waves and Sound  Mastering physics assignment (chapter 10)  Review and take Exam 2 | | Week 11  10/26-11/1 | Light  Mastering physics assignment (chapter 11)  Crash dummies lab  Discussion forum #3 | | Week 12  11/2-11/8 | Atoms and The Periodic Table (Chapter 12)  Mastering Physics assignment  Build and Atom Phet lab | | Week 13  11/9-11/15 | The Atomic Nucleus and Radioactivity  Mastering physics assignment  Penny Half Lab | | Week 14  11/16-11/22 | Elements of Chemistry  Mastering chemistry assignment  Molecular models Phet lab | | Week 15  11/23- 11/29 | Atomic and Molecular Attractions, states of Matter  Mastering physics Assignment (chapters 15 & 16 combined) | | Week 16  11/30-12/6 | Final Exam and Course Feedback | |

1. **Uniform Core Curriculum Assignments**

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| **Assignment Title** | **C & W Required** | **FSAC MGSED** |
| SCE 3420C Exam | Yes | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14 |