ST. PETERSBURG COLLEGE

COLLEGE OF EDUCATION

*The mission of the Education Community is to prepare future educators*

*who will promote lifelong learning and empower diverse communities.*

COURSE SYLLABUS

SCE 4113

Science Concepts in the Elementary Classroom

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

|  |  |
| --- | --- |
| **Course Prefix:** | SCE 4113 |
| **Section #:** | 3168 |
| **Credit Hours:** | 3 |
| **Co-requisites:** |  |
| **Pre-requisites:** | Admission to ELED-BS |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Day, Time and Campus:** | Online | Enter Time | Choose an item. | |
| **Modality:** | Online - Weekly participation is required for attendance. Participation in this course is defined as posting to the discussion board or submitting an assignment. | | | |
| **Professor:** | Meg Delgato | | | |
| **Office Hours:** | Check my faculty page for office hours and other important information:  <https://web.spcollege.edu/instructors/id/Delgato.Meg>  Click here to enter text. | | | |
| **Office Location:** | St. Pete Gibbs | | | TE 105-D |
| **Office Phone:** | 727-341-4422 office 727-543-5629 cell - Text is an easy way to reach me. | | | |
| **Email Address:** | Delgato.Meg@spcollege.edu | | | |

**ACADEMIC DEPARTMENT: College of Education**

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

1. **COURSE DESCRIPTION**

This is an introductory course designed to prepare individuals to teach general science programs at the elementary grade level. Students will explore fundamental concepts and principles found in the physical and biological sciences with emphasis on chemistry, earth science and biology. Through the lens of history and the nature of science, students will also explore the relationships between science and everyday life.

1. **MAJOR LEARNING OUTCOMES AND COURSE OBJECTIVES**

1. The student will analyze and apply developmentally appropriate researched-based strategies for science

classroom practice by:

a. selecting safe and effective instructional strategies to utilize manipulatives, models, scientific equipment, real-world

examples, and print and digital representations.

b. identifying strategies for formal and informal learning experiences that promote learners' innate curiosity and active

inquiry.

c. assessing collaborative strategies to explain concepts, to introduce and clarify formal science terms, and to identify

misconceptions.

d. differentiating strategies in science instruction and assessments based on learning needs.

e. identifying appropriate reading strategies, mathematical practices, and science content materials to enhance

science instruction for learners at all levels.

f. reviewing ways to organize and manage a classroom for safe, effective science teaching that reflect state safety

procedures and restrictions (e.g., procedures, equipment, disposal of chemicals, classroom layout, use of living

organisms).

g. selecting and utilizing appropriate technology, science tools and measurement units in data collection and the

pursuit of science.

h. using developmentally appropriate diagnostic, formative and summative assessments to evaluate prior knowledge,

guide instruction, and evaluate learner achievement.

i. selecting scientifically and professionally responsible content and activities that are socially and culturally sensitive.

2. The student will analyze concepts and principles related to the Nature of Science (NOS) by:

a. examining the dynamic nature of science models, laws, mechanisms, and theories that explain natural phenomena.

b. differentiating between the characteristics of experiments and other types of scientific investigations.

c. assessing attitudes and dispositions underlying scientific thinking such as curiosity, cooperation, collaboration, and

skepticism.

d. identifying the ways in which science is an interdisciplinary process and interconnected to STEM disciplines.

e. interpreting pictorial representations, charts, tables, and graphs of authentic data from investigations to make

predictions, construct explanations, and draw conclusions.

f. identifying and applying science and engineering practices through science process skills including observing,

classifying, hypothesizing, predicting, designing and carrying out investigations, and constructing and communicating

explanations.

g. examining the interactions of science and technology with society including cultural, ethical, economic, political, and

global factors.

3. The student will assess the nature and variety of forms of matter found in the universe by:

a. identifying and differentiating among the physical properties of matter (e.g., mass, volume, texture, hardness,

freezing point).

b. identifying and differentiating between physical and chemical changes (e.g., tearing, burning, rusting).

c. comparing the properties of matter during phase changes through the addition and/or removal of energy ((e.g.,

boiling, condensation, evaporation).

d. differentiating between the properties of homogenous and heterogeneous mixtures.

e. interpreting the relationship among atoms, elements, molecules, and compounds.

4. The student will assess the nature and variety of forms of energy found in the universe by:

a. identifying and comparing potential and kinetic energy.

b. differentiating among forms of energy including transformations of energy and their real-world applications to

chemistry, electricity, mechanics, heat, light and sound.

c. analyzing the functionality of an electrical circuit based on its conductors, insulators and components.

d. distinguishing among temperature, heat, and forms of heat transfer to include conduction, convection, and radiation.

e. identifying and applying the characteristics of contact forces (e.g., push, pull, friction), at-a-distance forces (e.g.,

magnetic, gravitational, and electrostatic), and their effects on matter (e.g., motion, speed).

5. The student will investigate the Earth system, the solar system, the universe, and the interactions that have

developed among them over time by:

a. identifying and analyzing the processes by which energy from the Sun is transferred through the Earth’s systems

(e.g., biosphere, hydrosphere, geosphere, atmosphere, and cryosphere).

b. analyzing the Sun-Moon-Earth system in order to explain repeated patterns such day and night, phases of the

Moon, tides, seasons and eclipses.

c. differentiating the composition and various relationships among the objects of our Solar System (e.g., Sun, planets,

moons, asteroids, comets).

d. examining major events in the history of space exploration and their effects on society.

e. comparing and contrasting the characteristics of geologic formations (e.g., volcanoes, canyons, mountains) and the

mechanisms by which they are changed (e.g., physical and chemical weathering, erosion deposition).

f. distinguishing among major groups and properties of rocks and minerals and the processes of their formations.

g. analyzing the characteristics of soil, its components and profile, and the process of soil formation.

h. identifying and analyzing the causes and effects of atmospheric processes and conditions (e.g., water cycle,

weather, climate).

i. identifying and analyzing various conservation methods and their effectiveness in relation to renewable and

nonrenewable natural resources.

6. The student will examine the organization of nature as well as the diversity and interdependence of life by:

a. comparing the characteristics of living and nonliving things.

b. analyzing the cell theory as it relates to the functional and structural hierarchy of all living things.

c. identifying and comparing the structures and functions of plant and animal cells.

d. classifying living things into major groups (i.e., Linnaean system) and comparing according to characteristics (e.g.,

physical features, behaviors, development).

e. predicting the responses of plants to various stimuli such as heat, light and gravity.

f. comparing and contrasting the structures, functions, and interactions of human and other animal organ systems

(e.g., respiration, reproduction, digestion).

g. distinguishing among infectious agents (e.g., viruses, bacteria, fungi, parasites), their transmission and their effects

on the human body.

h. analyzing the interactions of living things with each other and with their environment (e.g., food webs, ecosystems,

pollution).

i. identifying and comparing the life cycles and predictable ways plants and animals change as they grow, develop,

and age.

j. identifying and analyzing the processes of heredity and natural selection and the scientific theory of evolution.

k. identifying and analyzing plant structures and the processes of photosynthesis, transpiration, and reproduction (i.e.,

sexual, asexual).

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

|  |  |
| --- | --- |
| Textbook(s) | Required: Hazen, Robert and Trefil, James. (2009). *Science Matters: Achieving Scientific Literacy*, 2nd Edition, Anchor. ISBN-13: 978-0307454584 ISBN-10: 0307454584  AND  NSTA Learning Center Access Code |
| Recommended: |
| **Anthology Portfolio** | Anthology Portfolio is a requirement for students enrolled in all College of Education bachelor’s degree programs (Secondary Mathematics Education, Middle Grades Mathematics Education, Exceptional Student Education, Elementary Education, Educational Studies) and for all Educator Preparation Institute (EPI) students. |

Students using **eBooks** must have access to the **eBooks** during class sessions.

1. **Supplemental Material**

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

1. **Technology**

|  |
| --- |
| 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. |
| All work must be submitted in an original electronic file format unless otherwise specified. Links to files are not acceptable. |

1. **COURSE REQUIREMENTS & EXPECTATIONS**
2. **School Based Hours (SBH) or Field Experience Hours (FEH) Course Requirements**

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

Any student who is registered for a course with SBH/FEH is required to complete the application in Anthology Portfolio by the due dates specified by the OSP to guarantee placement.

1. **ALL Course Assignments**

**CPALMS Connections** – A description of CPALMS lessons and activities and their connections to course content will be developed for each of the four science content areas included in this course. Templates, grading checklist, and directions can be found in your course content. (45 points each/ 180 points total)

**Science Reading Fair/Literacy Project** – 200 points. You will develop a project that includes research on reading strategies. Project includes two milestone assignments to help you be successful in the project. See MyCourses for details.

**NSTA My Library Collection** – 100 points You will review and locate online resources on the NSTA Learning Center website. You will create a collection of selected resources to be shared with your classmates. Details are in MyCourses.

**Science Activities/Mini-Labs** – 220 points. You will complete different science activities for each of the content areas in the course: 1) Science Instruction/Nature of Science; 2) Physical Science; 3) Earth Space Science; 4) Life Science. All activities/mini-labs can be completed using household items you have in your kitchen or medicine cabinet.

**NSTA Professional Interactive E-Book** You will complete one Interactive E-Book topic of your choice on the NSTA website. The book and its assessment will be worth up to 100 points once completed. See course content and NSTA website for additional details.

**Final Exam** 200 points. You will have a multiple choice final exam with 55 questions that cover all of the elementary education science content competencies including science instruction, NOS, physical science, earth & space science, and life science.

**Total – 1000 Points**

|  |
| --- |
| ***UCC Assignments:*** *Teacher candidates must demonstrate Uniform Core Curriculum (UCC) competencies and earn a 2 or higher for each indicator on all UCC assignments [FEAP, ESOL, FSAC, Reading Competencies (RC), Other Elements and Florida State Standards (FSS)] in order to successfully pass the course.* *Educational Studies students must earn a 2 or higher on each indicator on all PLO assignments.*  *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.*  *Students in a degree program must upload into Anthology Portfolio all FEAP, ESOL, PLO, and RC assignments (identified as Critical Reading Tasks) as denoted in the Uniform Core Curriculum Assessments table at the end of the syllabus.* |

*For courses with lesson planning:*

Adapting or modifying a lesson plan from an existing source (i.e., the internet) does not mean “copy and paste.”  It means that, if you use someone else’s intellectual property for this purpose, you may read through the given source for ideas, but then rethink and rewrite the idea in your own words with your own modifications to meet the needs of the assignment.  Anything adapted or used verbatim must be cited with credit given to the author(s).  This includes specific citations on all supplementary materials (i.e., assignment sheets, graphic organizers, checklists) that are not originally your work.  This applies to all COE lesson plans unless the instructor directly specifies otherwise.

1. **Assignment Late Policy**

**Flexed due dates:** Dropbox assignments have flexed due dates to allow you to submit work in a date range with no late penalty. Dropbox assignments are due by Tuesday, 11:59 pm, and you have until Thursday, 11:59 pm to submit with no late penalty.

I encourage you to stick to the Tuesday deadline to keep you on track in this course. Take advantage of the flex due date when something unexpected comes up.

**Late work:** Dropbox work may be submitted up to Sunday, 11:59 pm. Dropbox work submitted after 11:59 pm on Thursday and before 11:59 pm on Sunday will be considered late work with up to a 20% reduction in points for the grade earned.

**What this means for you for dropbox assignments:** In the course, you will find a due date of Tuesday and an end date of Sunday. Flexed due dates mean you have a date range (Tuesday – Thursday) to submit with no penalty.

**The end date on the dropbox reflects a Sunday late-submission due date. If you submit after 11:59 pm Thursday but by Sunday, at 11:59 pm, your assignment will be reduced by up to 20%.**

Assignments not submitted by the Sunday late-work date will earn a zero in the grade book.

There will be an opportunity at the end of the course for a make-up assignment. The make-up assignment

may be used for missed work and/or as bonus points to help your average.

**IMPORTANT:** There is no flexed or late-date submission for work due the last week of classes/Week on your syllabus calendar.

1. **GRADING**

Course assignment details can be found in MyCourses by clicking on the Course Content tab. Incomplete assignments will NOT be graded. Instead, I will issue a grade of **0.1** to let you know the assignment is incomplete. **You may resubmit if the drop box is open. Your work may be subject to the late policy.**

**NOTE**: The consistent error I see here is a student uploading a blank document or template. Please check your work to ensure you have uploaded a completed assignment. **Always check the feedback box.**

10% can be deducted from assignments as a result of poor presentation, conventions (e.g. grammar, APA style), and support documentation as described in the assignment directions. This is in addition to the penalty for late work.

Attendance is required for COE courses. Attendance in online means submission of work to a dropbox and/or posting each week. Emails and/or logging into the course will not count for attendance.

Final grades in the course will be rounded up when the final grade meets the criteria for rounding. The final grade would have to be 89.5 to be eligible to round to a 90 (A-grade) or 82.5 to be eligible to round to 83 (B-grade) or 74.5 to be eligible to round to a 75 (C-grade).

Important to know about the grade book: The grade book system does not round automatically. I will add bonus points to push your average to round up, and I will make a note in the grade book so that you know your final grade has been rounded up.

|  |  |
| --- | --- |
| **3000 & 4000 Level COE Courses**  **Grade Scale** | |
| 90% – 100% | **A** |
| 83% – 89% | **B** |
| 75% – 82% | **C** |
| 68% – 74% | **D** (Repeat course) |
| 67% or less | **F** (Repeat course) |

**Turn-around time for submitted work:**

Since the official due date for work is Tuesday, my grading day is Wednesday. I will get work back to you by Wednesday evening for work that was due the day before on Tuesday.

If you submit early, I will do my best to grade early.

If you submit within the flex date range (meaning after Tuesday) or submit late, I will do my best to grade the work when received. Please note that if you take advantage of the flex date, you may delay the return of your work until the following Wednesday when I am scheduled to grade work.

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 this signifies that you agree to abide fully by the parameters set in this syllabus and any syllabus addendum.***

1. **CALENDAR AND TOPICAL OUTLINE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Weekly Topic** | **Readings/Assignment/Activities/Tasks** | **Due Date by 11:59 pm** |
| **Week 1**  **Aug 15** | |  | | --- | | START HERE Module Course content, syllabus, assignments  Pre-Test  Science Instruction-Who Does Science? | | Secure course materials: 1) NSTA access to Class Hub at *NSTA.org;* 2) course text by Hazen & Trefil | Prior to the start of next week |
| Read and review resources for Week 1; for fun, complete the introduction in The Water Cooler…not required but consider it a chance to get to know your classmates (and bonus points if you complete!) |
| **Work due:**   * **Pre-Test** | **Sunday, August 21**  **(For attendance Week 1)** |
| **Work due:**   * **Draw a Scientist Activity** | **Tuesday, August 23** |
| **Week 2**  **Aug 22** | |  | | --- | | Science Instruction-Science Safety, Tools & Measurement, Assessment | |  | | Review resources and readings for Week 2; if you have not yet set up NSTA access, please do so this week; begin thinking about book selection for Literacy Project | Prior to the start of next week |
| **Work due:**   * **Science Tools and Measurement PP Activity** * **Safety Contract or Safety Poster Activity** | **Tuesday, August 30** |
| **Week 3**  **Aug 29** | Nature of Science-  Myths of Science & Misconceptions | Begin reading Introduction & Chapter 1 *Knowing* in Hazen text; read and review readings and resources for Week 3; finish up finding a book to use for your Literacy Project | Prior to the start of next week |
| **Work due:**   * **Myths of Science Activity** * **Science as a Way of Knowing Activity** | **Tuesday, September 6** |
| **Week 4**  **Sept 5** | Nature of Science-  Science Process Skills | Review course readings and resources for Week 4; complete Introduction & Chapter 1 *Knowing* in Hazen text if you have not yet done so | Prior to the start of next week |
| **Work due:**   * **CPALMS NOS** * **Simple Experiment** * **Book Title & Author for Literacy Project to Discussion Post** | **Tuesday, September 13** |
| **Week 5**  **Sept 12** | Physical Science –  Force and Motion; Energy and Energy Transfer | Read Chapter 2 *Energy* in Hazen text; read and review course resources for Week 5 | Prior to the start of next week |
| **Work due:**   * **Newtons Laws Activity** * **Energy/Heat Transfer Activity** * **Milestone 1: Book Summary** | **Tuesday, September 20** |
| **Week** | **Weekly Topic** | **Readings/Assignment/Activities/Tasks** | **Due Date by 11:59 pm** |
| **Week 6**  **Sept 19** | Physical Science-  Electricity and Magnetism | Read and review course resources for Week 6; read Chapter 3 *Electricity and Magnetism* in Hazen text; start working on your Literacy Project | Prior to the start of next week |
| **Work due:**   * **CPALMS Physical Science** * **Magnetism Activity** | **Tuesday, September 27** |
| **Week 7**  **Sept 26** | Physical Science – Atoms & Atomic Architecture, Structure of Matter | Read Chapter 4 *The Atom,* Chapter 6 *Chemical Bonding,* Chapter 7 *Atomic Architecture,* and Chapter 9 *Fundamental Structure of Matter* in Hazen text; read and review course resources for Week 7 | Prior to the start of next week |
| **Work due:**   * **NSTA My Library Collection** * **Physical & Chemical Change Activity** | **Tuesday, October 4** |
| **Week 8**  **Oct 3** | Earth and Space Science –  Earth System, Solar System, The Universe | Start Reading Chapter 10 *Astronomy* and Chapter 11 *The Cosmos* in Hazen text; read and review course resources for Week 8; identify a Professional e-Book from NSTA if you have not yet done so; make some progress on your Literacy Project | Prior to the start of next week |
| **Work due:**   * **Space Exploration Timeline Activity** * **Planet Notes Activity** * **Moon Phases Activity** | **Tuesday, October 11** |
| **Week 9**  **Oct 10** | Earth and Space Science –  Geologic Formations & Rocks and Minerals | Read Chapter 13 *The Restless Earth* in Hazen text; read and review course resources for Week 9; | Prior to the start of next week |
| **Work due:**   * **Weathering & Erosion Activity** * **Rock Cycle Activity** * **Milestone 2: Text-to-World Narrative** | **Tuesday, October 18** |
| **Week 10**  **Oct 17** | Earth and Space Science –  Atmospheric Processes & Natural Resources | Read Chapter 14 *Earth Cycles* in Hazen text; read and review course resources for Week 10; work on Literacy Project | Prior to the start of next week |
| **Work due:**   * **CPALMS Earth Space Science** * **Water Cycle Activity** | **Tuesday, October 25** |
| **Week 11**  **Oct 24** | Life Science-  Organization of Nature | Read Chapter 15 *The Ladder of Life* in Hazen text; read and review course resources for Week 11; start working on the Professional e-Book if you have not yet done so | Prior to the start of next week |
| **Work due:**   * **Cells & Cell Structures Activity** * **Classifying Activity** * **Human Organ Systems Activity** | **Tuesday, November 1** |
| **Week 12**  **Oct 31** | Life Science –  Plant Science | Read and review course resources for Week 12; make some progress on your Literacy Project | Prior to the start of next week |
| **Work due:**   * **Photosynthesis & Transpiration Activity** * **Professional Interactive E-Book** | **Tuesday, November 8** |
| **Week** | **Weekly Topic** | **Readings/Assignments/Activities/Tasks** | **Due Date** |
| **Week 13**  **Nov 7** | Life Science –  Heredity & Evolution | Read Chapter 16 *The Code of Life,* Chapter 17 *Biotechnology,* and Chapter 18 *Evolution* in Hazen text; read and review course resources for Week 13; work on Literacy Project | Prior to the start of next week |
| **Work due:**   * **Evolution Survey Activity** * **DNA Extraction** * **CPALMS Life Science** | **November 15** |
| **Week 14**  **Nov 14** | Life Science – Ecosystems & Interdependence | Read Chapter 19 *Ecosystems* in Hazen text*;* finish readings and resources for Week 14 | Prior to the start of next week |
| **Work due:**   * **Food Chain Activity** * **Literacy Project – Final Products (Bib and Display)** | **Tuesday, November 29** |
| **Nov 21** | Harvest basket outline | **Thanksgiving Break** | **Be grateful…** |
| **Week 15**  **Nov 28** | Final Exam  Literacy Project DUE | Literacy Project Final Products Due Tuesday, November 29  Food Chain Activity Due Tuesday, November 29  No late work this week!  Prepare for Final Exam  See Final Exam Module for review materials and exam information.  Exam must be completed by 11:59 pm Sunday, May 1 | **Final exam opens Friday, December 2, at 6:00 am and closes Sunday, December 4 at 11:59 pm** |

1. **Uniform Core Curriculum / Program Learning Objectives Assignments**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assignment Title** | **Anthology**  **Portfolio** | **FEAP** | **FSAC** | **ESOL** | **OE** | **FSS** | **READING** |
| CPALMS Connections Activity | x |  | 3.1.1.; 3.1.2; 3.1.5 |  |  |  |  |
| Science Instruction & NOS Activities | x |  | 3.1.7 - 3.1.10; 3.2.3 - 3.2.5 |  |  |  |  |
| Physical Sciences Activities | x |  | 3.3.1; 3.3.2; 3.3.4; 3.3.8; 3.3.10 |  |  |  |  |
| Earth Space Science Activities | x |  | 3.4.1; 3.4.2; 3.4.7-3.4.9 |  |  |  |  |
| Life Science Activities | x |  | 3.5.3; 3.5.7 - 3.5.9 |  |  |  |  |
| Science Instruction Readings & Resources | x |  | 3.1.1 - 3.1.10 |  |  |  |  |
| NOS Readings & Resources | x |  | 3.2.1. - 3.2.8 |  |  |  |  |
| Physical Sciences Readings & Resources | x |  | 3.3.1 - 3.3.10 |  |  |  |  |
| Earth Space Science Readings & Resources | x |  | 3.4.1 - 3.4.9 |  |  |  |  |
| Life Science Readings & Resources | x |  | 3.5.1 - 3.5.11 |  |  |  |  |
| Literacy Project | x |  | 3.1.1; 3.1.3; 3.1.5 |  |  |  |  |
| NSTA Interactive Learning E-Book | x |  | 3.3.5; 3.3.10; 3.4.1 - 3.4.7;3.5.2; 3.5.7; 3.5.8 |  |  |  |  |
| NSTA My Library Collection | x |  | 3.1.10; 3.2.7; 3.2.8 |  |  |  |  |

This course offers opportunities for students to engage with the following Universal Design for Learning (UDL) General Understandings and Essential Components (1.0s and 2.0s): Not mapped on UDL framework.