CI 426-900: Teach ELEM Science P-4

Catalog Description: 426-3 An Introduction to Teaching Elementary School Science (PreK-4\textsuperscript{th} Grade). Content and methods of elementary school science education. One or more field trips. Prerequisites: SCI 210A and SCI 210B. Restricted to students already admitted to the Teacher Education Program.

Instructor: Carolyn Mohr  
Office: UCLC Science Lab-Room 321  
Office Hours: By Appointment  
Classroom: UCLC Science Lab-Room 321  
Day and Time of each Session: Saturday, 1:45 -4:15 p.m.  
(Two Monday evening meetings at 4:30 p.m. See Course Calendar)  
Dates: January 23, 2016 - May 14, 2016  
Final Exam: May 7, 2016

Course Structure & Description:  
This course is specifically designed to develop those cognitive processes and concepts needed by teachers in the teaching of Pre K – 4th grade science programs. This course will model an inquiry-based approach to teaching and learning science. A great deal of class time is devoted to “hands-on/minds-on” activities that deal with scientific concepts and how to teach them. Specifically you will learn about the following aspects: why teaching science matters; basic science concepts for Pre K - 4 level; and various science teaching strategies/approaches for modern science programs. You will also have an opportunity to develop, design, and teach lessons using various strategies including a 5 E inquiry lesson model and Formative Assessment Classroom Techniques.

Prerequisite: grade of C or better in SCI 210A and SCI 210B, or equivalent. Calendar/schedule with breakdown of each class session and assignments available on LiveText.

Course Alignment with Standards:  
This course has been aligned with the Next Generation Science Standards (NGSS), National Association for the Education of Young Children, Illinois Professional Teaching Standards, National Science Education Standards, National Educational Technology Standards for Teachers (NETS) and Illinois Science Learning Goals.

Illinois Professional Teaching (Learning/Responsibilities) Goals for Illinois PT Standards:  
Course Objectives include Reflective Classroom Planning, Organization and Management and are designed to give teacher candidates the opportunity to meet the following Illinois Professional Teaching Standards,
at a beginning level of competency. As a reflective educational leader, the teacher candidate will be able to utilize the principles and approaches of developmentally responsive pedagogy, Universal Design for Learning, and Response to Intervention in order to:

1. demonstrate an understanding of their responsibility as an ethical, developmentally responsive and reflective practitioner who exhibits professionalism. (IPTS 9B, 9C, 9E, 9G, 9H, 9I, 9J, 9K, 9M, 9N, 9O, 9S, and 9T)
2. demonstrate fluency in technology systems, and use technology to support instruction and enhance student learning and engagement. (IPTS 2L)
3. use a variety of explanations and multiple representations of concepts in planning for instruction. (IPTS 2M)
4. demonstrate an understanding of the Illinois Learning Standards (23 Ill. Adm. Code 1 Appendix D), curriculum development process, content, learning theory, assessment, and student development and knows how to incorporate this knowledge in planning differentiated instruction. (IPTS 3A)
5. evaluate teaching resources and materials for appropriateness as related to curriculum content and diverse student needs. (IPTS 2I)
6. analyze and use student information to design instruction that meets the diverse academic, social/emotional and developmental needs of students. (IPTS 1C, 1D, 1H, 3C, 3J and 4D)
7. demonstrate an understanding of principles and techniques of evidence-based instructional practices. (IPTS 5B, 5C, 5E, 5F, 5G, and 5H)
8. identify and evaluate effective principles and strategies for management and student engagement in the clinical placement. (IPTS 4A, 4B, 4C, 4D, 4E, 4G, and 4H)
9. demonstrate their understanding of how to develop short-range plans, including transition plans, consistent with curriculum goals, student diversity, learning theory, and the role of technology. (IPTS 3B, 3C, 3E, and G)

CI 426 will specifically address IPTS as written in goals 1, 3, 4, 5, 6, 7, & 9 above as it relates to teacher preparation.

Course Goals:
The document, “Standards for Science Teacher Preparation”, published by the National Science Teachers Association, Revised 2003, identifies goals for our class as it relates to the teaching of science. (www.nsta.org) This course will emphasize NSTA goals 1 – 9, 12, and 13 listed below.
1. Develop robust science knowledge and skills beyond the depth and breadth needed for teaching a curriculum based on the National Science Education Standards (NSES) at the grade levels they are preparing to teach.
2. Teach science effectively and appropriately based on the cognitive development of students.
3. Construct science concepts with understanding and reflect on the history and nature of science, including the development of major concepts, theories, assumptions, and tenets of scientific practice.
4. Consider the applications of science in society, the relationship of science to engineering, and the impact of cultural and personal values on science.
5. Create a learning environment that encourages inquiry, which includes the questioning and evaluating of evidence, justifying assertions scientifically, and reflecting on the prospective teachers’ assumptions % practices.
6. Collaborate with a community of learners, including expert science teachers, science teacher educators, and pure and applied scientists.
7. Engage in meaningful laboratory and simulation activities using contemporary technology tools and experience other science teaching strategies with faculty who model effective teaching practices consistent with those expected of the prospective teachers.
8. Understand science-specific pedagogical knowledge grounded in contemporary scholarship and school environments.
9. Observe diverse learners’ ideas of science and prepare teaching plans to help the students develop more meaningful understanding of science.
10. Implement their teaching plans, assess and reflect on the learning outcomes, and adjust their
teaching to enhance their students’ understanding.
11. Engage in databased decision making regarding their teaching behaviors, strategies, and the selection of topics, activities, and materials.
12. Understand how to find and use credible information on the school community, on the curriculum, and on safe and effective use of laboratory activities, independent science projects, science fairs, field trips, simulations, computer tools, and alternative curriculum resources.
13. Develop dispositions for effective science teaching, including a sense of responsibility to students and the community and dedication to the need to grow continually, in part through active involvement in the larger science education community.

Evaluation Procedures:
Evaluation is based on Readings, Discussions, and other Assignments, Participation/In-Class activities, Individual Lesson Plans/Units, Group Lesson Plans/Presentations, Participation/Online Activities, Quizzes, and Final Exam.

A 90-100;
B 80-89;
C 70-79;
D 60-69;
F Below 60

Participation/ in class activities = @30%
Reading/Reflections/Assignments = @40%
Lesson Plans/Unit = @20%
Safety Posters/Classroom Contracts = @5%
Quizzes & Final Cumulative Exam = @5%
Final grades are determined by taking the total points earned and dividing that total by the total number of points possible for the semester.

General Expectations:
I have an expectation that you will treat the course in a serious manner reflecting your intentions to become a teaching professional. You should show respect for self, peers, staff, instructors, faculty, and materials at all times.

Disruptions to learning cannot be tolerated. Examples of disruptions include, but are not limited to, inappropriate use of electronics, working on non-class related work, non-participation, talking/engaging in activities off topic, and being excessively loud.

Participation:
Your participation in activities and discussions is essential. You must demonstrate your commitment, interest, leadership, and enthusiasm in the teaching profession. Please share your thoughts and ideas during discussions and cooperate with your classmates during activities. In these ways, each person benefits from the knowledge and skills of the entire class. You will need to participate in activities and discussions in order to get the most out of the course. Activities done in class may be graded and will count towards your final grade.

Materials/Text:
Your text is the NSTA e-Text and information on how to purchase it will be given on Day 1 - be sure to bring your credit card. The cost is $99. You will also asked to bring in an inexpensive protractor and empty .5 L water bottle.

Attendance:
Because so much of the learning associated with this class takes place through hands-on activities during the class session, attendance at all class sessions is required. As a teaching professional, you are expected to be present and on time. Schedule/reschedule all appointments (Dr., hair, etc...) outside of class time. If you must be absent for any reason, let me know ahead of time when possible and document the absence on a full size sheet of paper when you return to class. Include your name, date(s) general reason for absence and attach relevant evidence to this paper. Excused absences include, but are not limited to, religious holidays, illnesses, or death in the immediate family. If you are late, make sure to speak with me after class. You will lose 2.5% for each unexcused absence and 1% for each tardy. More than 2 absences or tardies, excused or unexcused, or lack of participation, may result in a drop in your grade or my asking you to drop the course.

Note on Academic Integrity:
Careful attention must be made to produce your own original work and to give credit to the ideas of others. Please be aware that plagiarism includes taking credit for ANYTHING created, developed, and/or discovered by another person, including (but not limited to) words, sentences, or ideas. The SIUC Student Conduct Code includes the following possible penalties for plagiarism: failing grade for the work in question; failing grade for the course; revocation of a degree; and other disciplinary actions, including reprimand, censure, probation, or suspension. – See the Morris Library Guide on Plagiarism http://libguides.lib.siu.edu/plagiarism
SIU/C uses APA formatting for internal citations and Reference Lists. Ask your instructor at the beginning of the semester if you need suggestions for where to get additional assistance.

Special Needs Learners:
Students with special needs are encouraged to discuss these with the instructor. Every effort will be made to make the accommodation(s) necessary to ensure a positive learning experience. Students may also want to contact Disability Support Services, Woody Hall B-150 (453-5738 voice/453-2293 TTY/453-5700 fax) to find out what help they offer.

Emergency Procedures: SIUC at UCLC is committed to providing a safe and healthy environment for study & work. Emergency response information will be shared as it is provided by the UCLC. From time to time there may be an emergency drill conducted by UCLC. We will follow all such instructions when disseminated during class sessions. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

Statement on Inclusive Excellence:
SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ from you is an important part of your education in this class, as well an essential preparation for any career.

SIU Policy on “Incomplete” as a Course Grade:
The following text is taken from the 2011-2012 Undergraduate Catalog, p. 32: An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever
comes first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. Students should not reregister for courses in which an INC has been assigned with the intent of changing the INC grade. Re-registration will not prevent the INC from being changed to an F.

**Resources for additional academic help:**
If you have any type of need for which you require accommodations to promote your learning in this class, please contact me as soon as possible.

**Saluki Cares:**
The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call, or send:

http://salukicares.siu.edu/index.html; (618) 453-5714, or siucares@siu.edu

**Official SIU Student Email Policy:** [http://policies.siu.edu/policies/email.htm](http://policies.siu.edu/policies/email.htm)

**SIU Student Conduct Code:**

**LiveText**
Assignments and other useful information will be found on LiveText. *It is your responsibility to check your LiveText account daily to manage your work and look for announcements.*

As your instructor, I will check my email twice in the day. The last time I usually check my email will be around 7:00 pm. Do not expect me to check for any emails after this time. Allow up to 24 hours for a reply to an email once it is opened. Do not expect your instructor to check emails over the weekend (Friday, 12:00, noon, through Monday, 9:00 am).

**PLEASE NOTE:**

If you need to communicate with your professor, then you should do so via the email listed on the syllabus.

If you post/submit an assignment on LiveText, the instructor is not responsible if it does not appear. For example, a student may forget to include an attachment.

CI 426 is part of the course work required in the Teacher Education Program; therefore the following information should be studied to understand how CI 426 fits into the general scheme of things:

**Teacher Education Program**
The Teacher Education Program (TEP) at Southern Illinois University Carbondale is fully accredited by the National Council for the Accreditation of Teacher Education/
Council for the Accreditation of Educator Preparation (NCATE/CAEP) and by the Illinois State Board of Education. Spanning the entire university, the Teacher Education Program is administered through the College of Education and Human Services and includes majors from the College of Education and Human Services, the College of Science, the College of Liberal Arts, and the College of Agricultural Sciences. Teacher education programs approved by the State Educator Preparation and Licensure Board (SEPLB) are offered at the undergraduate level in early childhood education, elementary education, special education, secondary education, and in majors and minors that lead to the special certificate to teach K-12 art, music, physical education, and foreign languages.

Teacher Education Conceptual Framework:
Preparing Reflective Educational Leaders

The conceptual framework identified by Southern Illinois University Carbondale’s College of Education and Human Services reflects the professional community’s commitment to preparing reflective educational leaders at both the undergraduate and graduate levels. Reflective educational leaders are able to review, reconstruct, reenact, and critically analyze their own and their students’ performances as a means to formulate explanations with evidence. A reflective educational leader fosters his/her professionalism in practice when he/she values students’ myriad identities, equips students with the literacies required to participate in a democratic society, and engages stakeholders to make this learning accessible, rigorous, and relevant. Our conceptual framework views the professional development of teachers and other educational personnel to be an evolutionary and maturational process. Our goal is to prepare a competent, reflective educational leader, ready to assume the responsibilities of educating individuals but with full awareness that his or her induction into the profession continues throughout the duration of his or her professional career. We believe that our teacher candidates not only practice reflective thinking but also become practitioners of reflective action. We believe that effective teaching is characterized by interactions with students to present subject matter, followed by informed reflection on these interactions and presentations. Teachers should make decisions among methods and content based on their competence in both subject matter and pedagogy, rather than acting as technicians following a predetermined curriculum. All unit programs are aligned to the Illinois Professional Teaching Standards as well as standards from their respective content areas. The model below represents the three major tenets of SIU’s Teacher Education Program: Literacies, Identities, and Engagement:
Literacies:
Reflective educational leaders understand the vast array of literacies students need to function in today’s modern society. This includes knowledge of reading, writing, and aural communication within the content area as well as media, scientific and quantitative literacy (Chessin & Moore, 2004; Crowe, Connor, & Petscher, 2009; Cunningham & Stanovich, 2001; Delpit, 1995; Kear, Coffman, McKenna, & Ambrosio, 2000; Leinhardt & Young, 1996; McKenna & Kear, 1990; Moje, 2008; Perry, & Delpit, 1998; Shulman, 1987; Schwartz, 2005; Wilson, 2006; Wineburg, 2001).

Identities:
Reflective educational leaders understand the diverse characteristics and abilities of all students and how these students develop and learn within the context of their social, economic, cultural, linguistic, and academic experiences. Using these experiences they create instructional opportunities to maximize student learning (Brown, 2005; Cramer, 2006; Epstein, 2009; Irvine, 1997; Olsen, 2010; Rose & Meyer, 2002; Vygotsky, 1962/1996; Washburn, Joshi, & Binks-Cantrell, 2011).

Engagement:
Reflective educational leaders are ethical and reflective practitioners who exhibit professional engagement by providing leadership in the learning community and by serving as advocates for students, parents or guardians, and the profession (Amatea, Daniels, Bringman, & Vandiver, 2004; Bemak, & Chung, 2008; Hiebert, Morris, Berk, & Jansen, 2007; Keys, Bemak, Carpenter, & King-Sears, 1998; Lach & Goodwin, 2002; Ladson-Billings, 1995; McCann & Johannessen, 2008; Ratts, DeKruyf, & Chen-Hayes, 2007).

Dispositions
The professional attitudes, values, and beliefs demonstrated though verbal and nonverbal behaviors (dispositions) as educators interact with students, families, colleagues, and communities should support student learning and development. These dispositions are:
The candidate demonstrates professionalism:
• dependability and reliability
• honesty, trustworthiness, ethics
• enthusiasm, love of learning and commitment to the profession

The candidate values human diversity:
• shows respect and sensitivity to the learning needs and abilities of all individuals
• shows respect and sensitivity to the diverse cultures, languages, races, and family compositions of all individuals
• strives for best practices to address diverse learning needs and abilities of all individuals
• strives for best practices to address diverse cultures, languages, races, and family compositions of all individuals
• collaborates with diverse peers, professional colleagues, staff and families

The candidate develops professionally:
• engages in ongoing acquisition of knowledge
• engages in development of research-based practices
• assesses own performance and reflects on needed improvements

References


Please note: This is a living, breathing document that may be modified/changed by instructor throughout the course in order to accommodate/differentiate the course content to meet the individual and group needs of the class.
<table>
<thead>
<tr>
<th>Session # and Date</th>
<th>Probable Topics</th>
<th>Potential Assignments**</th>
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</thead>
<tbody>
<tr>
<td>1 January 23, 2016</td>
<td>Introductions&lt;br&gt;E-text subscription&lt;br&gt;Features of E-text portal&lt;br&gt;Discrepant Event Presentations (mesh jar and think tube)&lt;br&gt;Student make their own “Defying Gravity Jars”</td>
<td>Complete Science Beliefs Quiz 2&lt;br&gt;(bring copy of results to class)&lt;br&gt;Attend optional webinar&lt;br&gt;Reading Assignment 1:&lt;br&gt;Complete two book chapters&lt;br&gt;Complete two posts in private forum&lt;br&gt;due: Th., Jan 28th 11 p.m.&lt;br&gt;Sign up for discrepant event&lt;br&gt;(date and topic) on GoogleDocs&lt;br&gt;Once LiveText is up and running, students will go there to access assignment information including when due. This time email was sent.</td>
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<td>2 January 30, 2016</td>
<td>Students’ Beliefs &amp; Misconceptions&lt;br&gt;Review Science Beliefs Quiz 2 – use to help determine which Sci Pack Pre-assessment to take on NLC homepage&lt;br&gt;5 E Inquiry Lesson Plan – see Water Screen article and DE template&lt;br&gt;Pedagogy vs. Content&lt;br&gt;<a href="http://undsci.berkeley.edu/teaching/k2.php">http://undsci.berkeley.edu/teaching/k2.php</a>&lt;br&gt;<a href="http://undsci.berkeley.edu/teaching/35.php">http://undsci.berkeley.edu/teaching/35.php</a>&lt;br&gt;(K-2 &amp; 3-5 teachers’ lounges)Berkeley&lt;br&gt;SciPack PreAssessments due Feb 6&lt;br&gt;SciPack, download, completion due May 7th, &amp; Pedagogical Implications&lt;br&gt;How Big is a Foot lesson model&lt;br&gt;APA formatting How to same as in EDUC 313&lt;br&gt;DE Presentations – 2 students</td>
<td>For Discrepant Event Assignment due on presentation day- see sign up:&lt;br&gt;Water Screen Discrepant Event (Discrepant Event Template)&lt;br&gt;Reading Assignment 2 due by Thursday evening.</td>
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<tr>
<td>Date</td>
<td>Event Description</td>
<td>Assignments/Readings</td>
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<td>March 12, 2016</td>
<td>Special Guest: Justine Romero FACTS presentations -2 Accommodations vs. Modifications Design Engineering Challenge 2</td>
<td>See LiveText for assignment(s) Possible readings due by Thursday evening: Methods and Strategies: Using Models Effectively &amp; Rethinking Models (s-2LT)</td>
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<td>March 19, 2016</td>
<td>FACTS presentations -2 Starry Night Backyard Solar System 3-D Model</td>
<td>See LiveText for assignment(s) due by Thursday evening (Possible readings: You choose any two articles or book chapters on differentiating, modifying or accommodating in science lessons) (s-10LT)</td>
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<td>March 26, 2016</td>
<td>Spring Vacation</td>
<td>No class on March 26</td>
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<td>April 4, 2016</td>
<td>FACTS presentations -2 Cookbook vs. Inquiry Lessons revisited Using stories/mysteries The Crooked Swing Pendulum Activity</td>
<td>See LiveText for assignment(s) Possible Readings due Thursday evening: Book Chapter: The Crooked Swing Journal Article: about Cookbook vs. Inquiry Lessons and/or Pendulum article</td>
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<td>April 9, 2016</td>
<td>FACTS presentations -2 Reviewing the Learning Theorists &amp; BestTeachingStrategies/Practices</td>
<td>See LiveText for assignment(s) Work on Unit Write-ups and Live Presentations</td>
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<td>April 16, 2016</td>
<td>Earth Day Everyday Environmental Citizenship Integrating Science with all other subjects</td>
<td>Work on Unit Write-ups and Live Presentations Unit Plan Write Up due Thursday evening April 19, 2016.</td>
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<tr>
<td>April 23, 2016</td>
<td>Student Unit Presentations</td>
<td>See LiveText for assignment(s) Unit Plan Write Up and Oral Presentation Slides DUE today.</td>
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<td>May 2, 2016</td>
<td>Student Unit Presentations</td>
<td>See LiveText for assignment(s)</td>
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<td>May 7, 2016</td>
<td>Student Unit Presentations &amp; Final Exam Looking at KITS and other science curricular resources</td>
<td>See LiveText for assignment(s) SciPack Certificate Completion due today</td>
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<tr>
<td>May 14, 2016</td>
<td>Field Trip</td>
<td>See LiveText for assignment(s)</td>
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SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:  http://safe.siu.edu

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: (618) 453-5714, or siucares@siu.edu, http://salukicares.siu.edu/index.html

EMERGENCY PROCEDURES

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. We ask that you become familiar with the SIU Emergency Response Plan and Building Emergency Response Team (BERT) programs. Emergency response information is available on posters in buildings on campus, available on BERT’s website at www.bert.siu.edu, Department of Safety’s website at www.dps.siu.edu (disaster drop down) and the Emergency Response Guideline pamphlet. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

INCLUSIVE EXCELLENCE

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well an essential preparation for any career. For more information please visit:  http://www.inclusiveexcellence.siu.edu/

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:

Tutoring:  http://tutoring.siu.edu/
Math Labs: http://math.siu.edu/courses/course-help.php

WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit http://write.siu.edu/

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY

Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit:

http://diversity.siu.edu/

Additional Resources Available:

SALUKINET: https://salukinet.siu.edu/cp/home/displaylogin
ADVisement: http://advisement.siu.edu/
PROVOST & VICE CHANCELLOR: http://pvcaa.siu.edu/
SIU ONLINE: http://online.siu.edu/