1. **History, Development and Expectations of the Program**

   a. Provide, to the best of your ability, a brief description of the program’s history including the evolution of the program over the years. Describe specific changes that have been made to the program curriculum, changes to student demographics and the impact of these changes on the program, and efforts to recruit students to the program. If this is a new program, describe efforts to build the program and the progress of these efforts to date. (550 words)

   The Institute for Science Instruction and Study (ISIS) was developed in 1985 as a collaborative initiative between the School of Education and the School of Arts and Sciences. The goal of the program was to develop a science content-based science education program that engaged science educators (7-12) in an interdisciplinary program with a new and cutting edge format. The program was designed to be a series of learning modules and events without the structure of traditional course work. In addition to program faculty, ISIS depends heavily on the involvement of research scientists. The program was approved by the CT. Department of Education in 1985. Under a grant from the National Science Foundation the program began in 1986. The three major components are opportunities for teachers to be engaged in; discussions about cutting edge research presented by scientists, mentorships with research scientists, and competency in reading and writing in the disciplines of scientific and science education.

   During the past three decades the program has developed strong relationships with nationally recognized institutions such as The National Institutes for Health, Smithsonian Institution, NASA, Wood’s Hole Marine Biologic Laboratories and the Oceanographic Institution, American Association for the Advancement for Science and Yale, Harvard and Massachusetts Institute of Technology. Scientists involved with ISIS include such individuals as Nobel Laureates Francis Crick and Sidney Altman, and science communicators John Rennie, editor of Scientific American, and Neil deGrasse Tyson (host of NOVA: Science Now and Cosmos: A Space Odyssey). Students have participated in mentorships at these institutions as well as with research agencies in Costa Rica, Sweden, South Africa and at locations throughout the US.

   The most significant change to student demographics has been the financial constraints and time demands placed on students from professional and family obligations. ISIS is a 2-year cohort program that meets Friday afternoons/early evenings and Saturdays once a month. We also meet for two weeks each summer and require a 2-week mentorship during the first year of the program. In the two-year program there are three field experiences; Boston, Woods Hole and Washington, DC. Faculty work diligently to keep travel costs at a minimum. Faculty, also work closely with school and professional
meeting schedules to accommodate student obligations. This time frame allows for students to complete their program in a structured, timely fashion.

The only one significant curricular change to the program in recent years grew out of a greater recognition of the value of science content related to the history of science, science and the media, science education initiatives and nature of science. Students have responded positively to the integration of these topics and many of them can be directly applied to in their classrooms.

Students are recruited through mailings through the Connecticut Science Supervisors, alumni, and to Science Department Chairs throughout Connecticut. Faculty, also attend SCSU Open Houses and encourage current students to consider ISIS as part of their professional development. Along with a having a reputation for a high quality program, teachers hear about ISIS from their teaching colleagues. Having strong, positive relations with current participants has proven to be the best method of recruitment.

b. Is there anything else you would like us to know? (Issues you might choose to discuss could include visibility of the program, relationships the program has external to the university, changes in the economic support for the program, staffing, etc.) (150 words)

Since 2008, ISIS has struggled with recruitment. It has resulted in one cohort being delayed for a year until enough students could be matriculated and had the finances to register. The department delayed the Fall 2012 cohort in an effort to consider what revisions would encourage more teachers to consider ISIS. We know there is competition from the many one-year and on-line programs, and many teachers opt to pursue their Sixth-Year in the administrative certification. SCE faculty, are currently in discussion with the Educational Leadership Program to determine if a STEM based program within the ISIS structure may serve as a concentration in the Ed.D. Program. There is also a discussion of developing a distance-learning component to the program to enlarge the potential student base to New England states. We are actively investigating strategies to integrate and expand the program.

2. External Demand for the Program

a. Using the data provided, review and explain the relationship between the program and external factors that impact the:
   i. number of applicants and percentage of applicants accepted
   ii. 5-year enrollment trends (450 words)
<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Program</th>
<th>Applications</th>
<th>Accepted</th>
<th>Acceptance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2009</td>
<td>SYC-SCE</td>
<td>13</td>
<td>12</td>
<td>92%</td>
</tr>
<tr>
<td>2009-2010</td>
<td>SYC-SCE</td>
<td>1</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2010-2011</td>
<td>SYC-SCE</td>
<td>8</td>
<td>7</td>
<td>88%</td>
</tr>
<tr>
<td>2011-2012</td>
<td>SYC-SCE</td>
<td>2</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>2012-2013</td>
<td>SYC-SCE</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Enrollment

<table>
<thead>
<tr>
<th></th>
<th>Fall '08</th>
<th>Spr '09</th>
<th>Fall '10</th>
<th>Spr '10</th>
<th>Fall '11</th>
<th>Spr '11</th>
<th>Fall '12</th>
<th>Spr '12</th>
<th>Fall '13</th>
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<th>Spr Avg</th>
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<td>3</td>
</tr>
<tr>
<td>Male</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td>0</td>
</tr>
</tbody>
</table>

i. The data above reflect a two-year cohort process that begins every other year, thus alternating years applications are very low. Students who apply in years between cohorts are accepted early for the next cohort. As mentioned previously, no cohort was offered for the 2012-13 academic year. The 2013 cohort accepted 11 students and one dropped due to lack of financial aid support.

All applicants to the ISIS program are certified secondary level science teachers who have successfully completed a Masters Degree in a science or science education. Applicants have proven their ability to be successful at the graduate level making acceptance rates to the program very high. The program does turn away elementary teachers interested in science education and occasional math professionals interested in STEM-based programs. Students really need to have a minimum of 30 credits in science content to be successful.

ii. Over the past few year the enrollment trend has had a down turn. The excitement level and reputation of the program remains high according to applicants. It appears the downward trend may be the result of alternative programs or financial limitations. Potential students are recruited through mailings to secondary school science departments, notification to alumni, and at SCSU Graduate Studies Open Houses. In recent years attendance at the SCSU Graduate Open Houses has decreased significantly. Prior to 2008, the department table would have a line of students inquiring about programs. In recent years, of the potential students who visit our table only a small number are interested in a Sixth Year. We have here are a number of factors at play, but there are two that appear significant.

First, there has been a change in the financial status of applicants. Since ISIS is a Sixth Year program, the average age of applicants is about 10-15 years older than the MS candidates. They have relayed that they have financial obligations at home and often have
children in college. Where as a decade ago teachers paid their own tuition, now they require financial aid. They often weigh the cost of graduate school against the pay increase they will receive upon completion.

Second, in the past few years the State of Connecticut has been very vocal about changing the requirements for professional development PD programs for educators. Recent changes to State statutes require certain content area expectations. Luckily, the science education programs in the department are extremely well aligned with these new requirements. Now that that concern has been resolved, we can market the program in confidence.

b. Which employers, institutions and/or communities benefit from this program?
Describe how the program meets the needs of the state (e.g., economic, cultural, civic, etc.)? (150 words)

Our Sixth Year Certificate Program in Science Education serves K-12 districts throughout Connecticut. Educator contracts encourage teachers to pursue PD to enhance the quality of their science instruction in the schools. Teachers are provided financial incentives for completing graduate studies. When it comes to a Sixth-Year Certificate, many educators choose an administrative degree (092 certification). However, a significant number of teachers do not desire an administrative position, and therefore, are interested in a science education program.

SCSU has a long history in certifying K-12 teachers and providing opportunities for state required graduate work to maintain their certification. These programs enhance the qualifications of teachers. This program benefits the K-12 schools, the teachers themselves, and most important, the 100 or so students that each graduate teacher has in their sciences classes each year.

c. Is there anything else you would like us to know? (Issues you might choose to discuss could include competition from local, regional, and other institutions.) (100 words)

Recently, the State legislature and in the Department of Education have announced changes to the program requirements for PD Connecticut is currently in the process of accepting and integrating the Next Generation Science Standards NDSS in K-12 schools. There is a growing interest nationwide regarding STEM education. This increased importance in rigorous science education is critical, as our society becomes increasing dependent on science and scientific advances in medicine, engineering, agriculture and technology. It is essential that as SCSU prepares science educators that we provide cutting-edge science education PD programs to address these needs.
3. **Internal Demand for the Program**

a. Using the data provided, please describe how courses in your program serve students in other programs. What percentage of students in your courses come from other programs? Please provide enrollment data for graduate courses offered by your department that are required for other graduate programs. (Some of your discussion in this section may be repetitive, but is important in understanding the internal demand for the program.) (100 words)

There is no direct relationship between ISIS and other graduate programs or students in other than programs within the department. There are a number of ISIS participants who were undergraduates and/or Masters students that have complete their education at Southern. It is our mission to provide the most cutting-edge science education for our undergraduate and graduate students. The ISIS Program aligns with this mission of rigor and current topics in science.

b. How is enrollment for your graduate program influenced by enrollment in your undergraduate program? Is there potential for a formal pathway between the two programs? (100 words)

ISIS is strongly influenced by SCSU’s undergraduate programs in science education. Often students obtain their undergraduate degrees in science disciplines with science certification and return for their graduate work in science education.

There is an opportunity for a “formal” pathway to be established from our MS in Science Education. We are currently exploring the possibility of offering ISIS as a one-year program starting in the fall and running through the following summer. We are asking alumni and current students for feedback to determine if a highly condensed program is feasible for working families.

c.) How reliant are you on non-program students taking your courses? (100 words)

ISIS is not at all reliant on students from other programs taking courses. This is a cohort program.

d. Does the program produce services needed by other parts of the campus (e.g. clinics, testing services)? (100 words)

No.

e. Is there anything else you would like us to know? (100 words)

This standard focuses on the relationship between this program and other programs on campus. Currently ISIS does not have any formal relationships with other graduate programs. However, there are two things worth mentioning here. First, ISIS participants
are impressed at the quality of SCSU science faculty and their research. These teachers have an important role in directing their students toward college program and careers, and we expect them to look favorably at SCSU. Second, we are currently in discussions with the Educational Leadership Ed.D. program, to partner in a STEM Ed concentration using ISIS courses for the 30-credit concentration.

4. Quality of Program Inputs and Processes

a. Please provide a narrative of how the qualifications and assignments of your full- and part-time faculty align with and support the program. Please include a discussion of the challenges and successes the department faces in providing qualified faculty to meet the needs of the program. In those programs where it is appropriate, please discuss the integration of adjuncts into the program’s curriculum. (450 words)

Both full-time and part-time faculty are responsible for teaching in the program. All full-time faculty are experienced in science education and in coordinating PD programs in science education. The three full-time faculty who teach in the program are Dr. Cusato, Associate Professor (tenured), Dr. Scott Graves (tenured), and Dr. Catherine Koehler (tenure-track). Drs. Cusato and Koehler have degrees in science, K-12 teaching experience, and graduate work in science education. Dr. Graves’ background includes science undergraduate and graduate work in science education and marine studies. He transitioned into science and environmental education after completing his studies in the area of curriculum and instruction with a focus on science and instructional technology.

Adjunct member, Mr. Gerry Frumento, has 35 years of teaching experience in K-12 science and is professionally active in the Connecticut science education community. Mr. Frumento completed his graduate work at SCSU with his Sixth-Year Certificate in the ISIS Program. Mr. Frumento works closely with Dr. Cusato in scheduling class meetings and developing assessments. Drs. Cusato, Graves, and Koehler teach in ISIS on a rotation basis. Dr. Koehler and Graves share responsibilities for teaching and student assessment and evaluation. Each semester, 3 graduate credits are divided between these three faculty members.

b. Briefly describe the merits and logic of your curriculum. (250 words)

The ISIS program has a very unique curricular design being the first academic program to be approved in the State of Connecticut that is not designed around traditional course design and pedagogy. The program is designed to bring classroom teachers up to date with cutting edge science in a variety of scientific disciplines. Since most teachers are busy with day-to-day teaching, planning, grading and student related activities they rarely have time to pursue interests in science.

The themes woven throughout the year include: biotechnology, medicine, the earth sciences, physics and engineering, and chemistry research and application. Teachers read articles and research papers written by the research presenters or articles closely related
to the topic or field of the presenter. Presenters meet with teachers at SCSU or the programs visits scientific and research facilities in Connecticut and surrounding states. These experiences and interactions provide participants with a new perspective on the nature of and dynamism of science. They are encouraged to interact with scientists and facilities in their own communities that can serve as resources for them.

During the summer of the first year of the program, participants complete an internship with a research scientist or laboratory. It is our belief that this opportunity helps teachers to better understand the day-to-day culture of research and the subtle skills and knowledge that researchers use in the pursuit of new knowledge.

c. How dynamic is your program? Please identify and describe what procedures are in place to provide continued, regular evaluation and review (include formal and informal activities). Describe the impact of the review on the program and curriculum (e.g., FAAR data may be used as evidence, as well as other documentation of changes to the curriculum). (300 words)

ISIS is an extremely dynamic program at SCSU. As science is rapidly advancing and changing the world we live in, the topics, issues, presenters and field experiences change with every cohort to accommodate these current trends in science. One of the primary goals of ISIS is to engage teachers in cutting-edge scientific research. This requires ISIS faculty to keep abreast of advances in science and technologies through professional activities, reading and research.

The faculty involved with ISIS present regularly in science education at regional, national and international venues. ISIS faculty members are active in grant writing that integrate K-12 education and innovative science research. This year, faculty participated in a Math Science Partnership Grant and Environmental Protection Agency grant submissions. All are members of the National Science Teachers Association (NSTA) as well as other organizations that include Science Engagement for a New Civic Responsibility (SENCER), the Globe Program, Association for Science Teacher Education (ASTE), National Association for Research in Science Teaching (NARST), Connecticut Science Teachers Association (CSTA). The activities and efforts of faculty have allowed for ISIS participants to meet with nationally known figures in science and science education at institutions such as: the White House Office of Science, Technology and Policy; National Institutes for Health; National Atmospheric and Space Administration, the National Library and the Smithsonian Institution. ISIS has a strong history in local schools and known by scientific and science education institutions at a national level.

Although the thematic strands of science remain fairly constant, specific content varies per cohort. In addition to the assessments assigned for the presentations with researchers and the internship, the participants are required to complete a portfolio, write an article for publication, develop curricular units for their school that are based on science content learned in the program.
d. Is there anything else you would like us to know? (Issues you might discuss could include the quality of your incoming students, or a comparison of your curriculum, courses, assessments, and experiences to similar programs. How does your program better serve students than similar programs offered elsewhere?) (200 words)

ISIS is a unique science education program. There is no similar program offered in Connecticut.

Curriculum: There are no formal courses per se as the topics of discussion vary from year to year. Participants learn from interactions with scientists who work locally, regionally, and nationally. There is an emphasis on extensive science content that is interdisciplinary, cutting-edge and has an opportunity for student input and discussion.

Courses: The two-year cohort that meets on weekends throughout the year and during the summer. Students register as full-time during the fall and spring semesters, and for 3 credits during the summer. During the first summer, students complete two-weeks of full day classes and complete a research mentorship with a scientist of their choice. This mentorship requires a minimum of two-week period and is predetermined with assistance from faculty in the program.

Assessments: Students respond to scientific readings, submit portfolios each semester, complete a mentorship research report, develop lesson plans integrating science content from presentations and site visits, and submit a paper for publication based on their mentorship or research topic presented.

Experiences: Students experience on-campus presentations, and site visits to local research institutions, weekends in Woods Hole MA, Boston MA and Washington DC.

5. Quality of Program Outcomes

a. How does your program use assessment data to ensure quality of student outcomes? Describe the quality of your program outcomes. (e.g., G.P.A., Student Opinion Surveys, course evaluations, alumni surveys, professional assessment/evaluation, other assessments, participation in groups or organizations that focus on pedagogy or andragogy. Insert a table listing your program outcomes. Note that the table does not count in the word limit). (900 words)
<table>
<thead>
<tr>
<th>SYC-SCE</th>
<th>Fall '08</th>
<th>Spr '09</th>
<th>Fall '09</th>
<th>Spr '10</th>
<th>Fall '10</th>
<th>Spr '11</th>
<th>Fall '11</th>
<th>Spr '12</th>
<th>Fall '12</th>
<th>Spr '13</th>
<th>Fall Avg</th>
<th>Spring Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>4</td>
<td>7</td>
<td></td>
<td></td>
<td>7</td>
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<td>4</td>
<td></td>
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<tr>
<td>Overall GPA</td>
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**Course Information Survey**

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<tr>
<th>Statement</th>
<th>AY 08/09</th>
<th>AY 09/10</th>
<th>AY 10/11</th>
<th>AY 11/12</th>
<th>AY 12/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods of instruction have helped me understand the subject matter.</td>
<td>93%</td>
<td>94%</td>
<td>97%</td>
<td>100%</td>
<td>88%</td>
</tr>
<tr>
<td>Reading the assigned material has helped me understand this subject.</td>
<td>83%</td>
<td>85%</td>
<td>81%</td>
<td>73%</td>
<td>96%</td>
</tr>
<tr>
<td>Exams and out-of-class assignments have helped me understand the subject matter.</td>
<td>88%</td>
<td>89%</td>
<td>93%</td>
<td>91%</td>
<td>100%</td>
</tr>
<tr>
<td>Number of exams &amp; other graded assignments has been sufficient to evaluate my progress.</td>
<td>86%</td>
<td>92%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My experiences in this class make me want to learn more about this subject.</td>
<td>98%</td>
<td>89%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would rate the quality of instruction in this course as high.</td>
<td>91%</td>
<td>97%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would rate the overall quality of this course as high.</td>
<td>88%</td>
<td>92%</td>
<td></td>
<td></td>
<td>97%</td>
</tr>
<tr>
<td>This course helped me meet the learning goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This course evaluated how well I met those learning goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My experience in this course helped me appreciate this subject.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The instructor provided regular feedback on my performance in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The instructor had high standards for student achievement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The instructor encouraged me to take responsibility for my own learning.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Graduate Program Goals and Learning Outcomes: ISIS 6th Year

Program Goals:

1. To provide opportunities for students to learn about new scientific research findings in a variety of science disciplines from reading in research, and distinguished speaker presentations.

2. Provide science research apprenticeship experiences in order to immerse students in the process of research in a variety of science fields.

3. Provide opportunities for students to identify the process and products of current scientific research and their value / implications for classroom teaching and learning.

Learning Outcomes: Assessments built into any/all classes include (speaker research article reviews, speaker discourse review/critique/reflection essays, project reports, final internship report and presentation, portfolios, curriculum)

1. Critically evaluate scientific articles in order to identify their potential implications for society and education. Course(s) SCE 600, 610, 620, 630, 640, 650

2. Synthesize and communicate in written and oral formats information on current scientific research, and their applications and implications for society. Course(s) SCE 600, 610, 620, 630, 640, 650

3. Develop a written article of “publishable quality” in the field of scientific research or science education. Course(s) SCE 600, 610, 620, 630, 640, 650

4. Develop appropriate science inquiry-based classroom activities that are an outcome of scientist/teacher interactions. Course(s) SCE 600, 610, 620, 630, 640, 650

5. Distinguish and describe how developments in one field of scientific research help advance efforts in other research disciplines. Course(s) SCE 600, 610, 620, 630, 640, 650

Each weekend in the ISIS Program, students are required to complete a reading/homework assignment, an evaluation of the weekend and include notes, handout and any additional materials in a portfolio. The assignments are collected each weekend and returned at the next meeting using a Wikispaces format. Participants’ post their reactions to the experience on the Wikispaces website and program faculty comment on their responses.

The student GPAs provided do not include the years 2008-10 when there were 11 students in a cohort. The ISIS students perform very well with the exception of an
occasional student receiving a GPA of 3.0 and only one in over the years that failed. Student satisfaction is excellent, reflecting the important role faculty and students have collaboratively to provide quality experiences. Students are encouraged to identify topics or speakers to bring to the program. Together, faculty and students identify mentorships, projects and activities of interest. This involvement of students helps develop an ownership of the program which is reflected in their requests to continue their ISIS involvement in ISIS Congresses and informal meetings.

At the end of each semester, students submit a portfolio that is a collection of writings and homework assignments throughout the semester. Program faculty reviews the portfolio using an assessment rubric. The reading/homework assignments are the first place to recognize a concern with student learning, effort or interest. It should be understood that science teachers come to the program with a variety of academic preparation in a one of 4 core disciplines in science. The ISIS program requires that teachers read and comprehend science articles from a wide variety of disciplines. This often causes anxiety and a bit of frustration early in the program. The faculty support and encourage patience with this process as it helps teachers appreciate the frustration their students often have in learning a new area of science. Teachers quickly learn strategies for overcoming this challenge and this confidence allows them to learn much more about the connections between the science disciplines. This issue is particularly critical in science education today as the majority of fundamental scientific issues facing us today are highly interdisciplinary.

At the completion of the program all ISIS participants submit an article for publication. Faculty provide support and guidance throughout the process. Teachers often feel no one would be interested in what they have to say and are excited when ideas are well received and published. The article may develop out of their mentorship, a classroom activity that grew from a topic in science they learned about, or professional development strategies that help other professional educators enhance their science knowledge. Articles have been published in peer reviewed science journal and national and local science education journals such as Science Teacher and Connecticut Journal of Science Education.

Grades were not reported accurately on the data provided, but in reviewing recent grades most students received grades of A- to A+. The cohort structure and assessments are designed to be of value, and as such, the results demonstrate very high quality student work. Because ISIS teachers have their certification in various science disciplines, assessments and support are integrated to help them make connections in this highly interdisciplinary program. ISIS faculty understand that a teacher of earth science may struggle with content knowledge regarding cell biology and genetics (and visa versa) so assessments are designed to evaluate the ability of teachers to identify their own strengths and weaknesses in self reflections and synthesized analysis of the experiences.
b. Is there anything else you would like us to know? (Issues you may choose to
discuss could include preparing your students for employment or further
scholarly pursuits. Where possible provide data driven examples, e.g., number of
students who pass the licensing exam). (300 words)

Students in ISIS are generally teachers who have been teaching ten years or more and
have fulfilled all State requirements. As Sixth-Year candidates these teachers needed
to make a decision whether to pursue the Sixth-Year in administrative certification or
ISIS. Since many science teachers do not wish to leave the classroom, ISIS becomes a
program in which they can reconnect with the excitement of science, learn about the
science being done at institutions in the State as well as, throughout the region. ISIS
faculty believe that it is important for science educators to know how science is
researched and practiced, and how scientific and science education policies developed
at the national level. Meeting with leaders at the White House Office for Science,
Technology and Policy, the American Association of the Advancement of Science and
NASA, provides ISIS teachers with experiences and insights they could never gain on
their own or through another program.

Faculty must keep abreast of current science and science education in order to bring
the newest and exciting science to them. Through our creative activities we make these
contacts and share them with our students.

6) Size, scope and productivity of the program

a. How many credit hours does the program generate? (table generated by
OMIR)

<table>
<thead>
<tr>
<th>Credits Generated</th>
<th>AY 08/09</th>
<th>AY 09/10</th>
<th>AY 10/11</th>
<th>AY 11/12</th>
<th>AY 12/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Academic</td>
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<td></td>
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</tr>
<tr>
<td>Credits</td>
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<td>279</td>
<td>198</td>
<td>216</td>
<td>90</td>
</tr>
<tr>
<td>Major Credits</td>
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<td>171</td>
<td>189</td>
<td>60</td>
</tr>
<tr>
<td>Total Students</td>
<td>66</td>
<td>71</td>
<td>53</td>
<td>55</td>
<td>30</td>
</tr>
</tbody>
</table>

The program is a two-year 30-credit cohort experience. That translates to 15 credits
per year per student. The numbers presented in the chart are an incorrect assessment of
the program. Cohort #1 had 180 credits per year with 12 students; Cohort #2 had 150
credits per year; and Cohort #3 has 90 credits per year. Part of the reason for the low
number in the last cohort was that not all students were fully matriculated at the time
and needed to come part time. There has also been a decrease in numbers for students
since 2008 from cohorts in the 14-18 range to 10-13.
b. What degrees or certificates are awarded? (This is a simple list of degrees and
twill list only one degree or certificate unless you are one of the programs
approved to report your data in combination)(in table form with item c)

A Sixth-Year Certificate in Science Education is awarded.

c. How many degrees or certificates have been awarded (five year data)?

<table>
<thead>
<tr>
<th>Degrees Conferred</th>
<th>AY 08/09</th>
<th>AY 09/10</th>
<th>AY 10/11</th>
<th>AY 11/12</th>
<th>AY 12/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYC-Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>22</td>
<td>9</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The number of graduates has declined significantly since the 2008 economic downturn.
Also, in 2010 the department full time secretary retired. For the following two years
we went without coverage or with a secretary being shared between three departments.
For the past three years we have shared a secretary with the Chemistry department.
The lack of consistent presence in the office and coverage for intersessions and
summer is lacking and has impacted enrollment in all the programs in the department.

d. Using data provided, present and discuss the record for graduate faculty in
research and creative faculty. (200 words)

**Category Counts by Program Faculty Productivity Data-6th Year Professional Diploma-Science Education**

Report Run Date: February 9, 2014  Report Date Range: July 1, 2009 to June 30, 2013

**Publications**

<table>
<thead>
<tr>
<th>Type of Publication</th>
<th>2009-2010</th>
<th>2010-2011</th>
<th>2011-2012</th>
<th>2012-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Article, Academic Journal</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Professional Presentations**

<table>
<thead>
<tr>
<th>Presentation Type</th>
<th>2009-2010</th>
<th>2010-2011</th>
<th>2011-2012</th>
<th>2012-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keynote/Plenary Address</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Paper</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Poster</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

**Professional Conference Participation**

<table>
<thead>
<tr>
<th>Role</th>
<th>2009-2010</th>
<th>2010-2011</th>
<th>2011-2012</th>
<th>2012-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendee</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
Faculty members in the ISIS program are active in research and creative activity. They are also involved in accreditation activities and reporting to the National Science Teachers Association (NSTA) and National Council on Accreditation for Teacher Education (NCATE). Publication records are varied amongst ISIS faculty members and include 2 peer-reviewed publications and three book chapter proposals submitted. ISIS faculty have also presented at least in one professional conference per year and/or attended conferences in their scientific disciplines as well as in science education. The ISIS faculty are also active in seeking grants. Each holds memberships in their professional organizations such as NSTA, CSTA, ASTE, SSMA, NARST, NAAEE. One faculty member is an associate editor of a national journal (Journal for School Science and Mathematics). Two faculty members are Associate Professors and one is a tenure-track second year Assistant Professor.

In addition, faculty members in ISIS have a history of integrating their research and creative activity with their teaching. These efforts have resulted in the approval of five new graduate courses and a proposed program revision (Graduate Program in Elementary Science Education) pending results of this program review. Each faculty member advises graduate students on special projects and graduate thesis.

e. What types of student or student/faculty research or creative activity have been developed and or produced (e.g., include theses, dissertations, special projects)? (100 words)

During the program, ISIS teachers complete a research-based mentorship, develop curriculum, and write and submit a paper for publication (discussed previously). Faculty coordinate and work with students in identifying possible mentorship opportunities and in making contact and arrangements for the teachers to participate in a research project. The teachers develop classroom activities that are frequently recognized by media for their creativity. For example a teacher completed a mentorship with a scientist that presented on “The Electronic Nose” to ISIS and then she had her students design and build electronic noses to identify real versus fake perfumes.
f. In your narrative discuss how all these data impact or have impacted the size, scope or productivity of your program. (200 words)

The data provided or discussed in this standard do not significantly impact the size, scope or productivity of the program. The professional activities of the faculty do provide them with the knowledge to identify issues in science and topics that should be integrated in the program. The experience of faculty in teaching, accreditation and assessment help prepare teachers with skills necessary to integrate these new science concepts in their classroom and align them with the state and national standards.

g. Is there anything else you would like us to know (this might include a discussion of equipment purchased solely for the purposes of the graduate program). (100 words)

There is no specific equipment needs for the program. Expenses associated with the program include travel and stipend expenses when faculty travel with students to sites in Massachusetts and Washington, DC.

The ISIS model of professional development is one that engages student/professionals with outstanding scientists in their fields. This program is unique and provides students with knowledge and insight into the profession in a way traditional course of study cannot. This Sixth Year Certificate Program could serve as a template for the development of other Sixth Year Programs at SCSU.

7) Revenue and other resources generated by the program

a. What are the sources and how much revenue does the program generate through student enrollments?

a.) Table 7.1: Revenue

<table>
<thead>
<tr>
<th>Display Orgn Code</th>
<th>Prior Pgm For Reports</th>
<th>Fiscal Year</th>
<th>Student Tuition/Fees</th>
<th>Other Revenue</th>
<th>Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>280520</td>
<td>SYC-SCE</td>
<td>2010</td>
<td>57,685</td>
<td>60,330</td>
<td>118,015</td>
</tr>
<tr>
<td>280520</td>
<td>SYC-SCE</td>
<td>2011</td>
<td>49,255</td>
<td>40,247</td>
<td>89,502</td>
</tr>
<tr>
<td>280520</td>
<td>SYC-SCE</td>
<td>2012</td>
<td>38,615</td>
<td>40,014</td>
<td>78,629</td>
</tr>
</tbody>
</table>

ISIS revenue through tuition and fees has decreased by approximately one-third as is also reflected in the “other revenue” and “total”. This decrease is directly related to the decrease in enrollment.
b. What are the sources and how much additional revenue does the program generate through fees such as laboratory or special user fees? (50 words)

There are no laboratory fees, user fees or additional revenue generated.

c. What are the sources and how much revenue does the program generate by services (e.g., external or to other programs)? (50 words)

There is no revenue generated by services.

d. In the narrative on this section discuss how the revenues and other resources impact the size, scope and productivity of your program? (100 words)

The direct revenue from the program does not impact the size directly. Resources in terms of administrative support (secretarial) and meeting space do present a challenge. Because the program meets one “weekend” and three Thursdays a month reserving a regular meeting room is not possible because of limited classroom space on campus so students and presenters are scheduled to meet in various rooms in Jennings. On weekends, the program meets in the science education classroom (JE 335).

e. Is there anything else you need us to know? (You may wish to discuss grant activity, gifts to the University, etc.) (100 words)

During this review period, there was no outside support for the program. It would be important for 3 credits of reassigned time be provided for a coordinator to help recruit students and create a web presence of mentorships, publications and creative activities of this program. This could help SCSU have a more significant reputation in science education in the state and region.

8) Costs and other expenses

a. What are the total costs of the program? (table)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Employee Compensation</th>
<th>Operation Expenses</th>
<th>Allocated Overhead &amp; Indirect</th>
<th>Grand Loss</th>
<th>Net Income (Loss) Per BCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>21,303</td>
<td>289</td>
<td>33,522</td>
<td>55,114</td>
<td>374.32</td>
</tr>
<tr>
<td>2011</td>
<td>17,455</td>
<td>207</td>
<td>25,351</td>
<td>43,013</td>
<td>368.71</td>
</tr>
<tr>
<td>2012</td>
<td>17,708</td>
<td>144</td>
<td>22,320</td>
<td>40,172</td>
<td>397.1</td>
</tr>
</tbody>
</table>
Costs of the program have decreased over this period. The cost for the program over the three years appears flawed. All costs decreased, including the Grand Loss, yet the Net Income Loss appears to be greater.

b. What is the ratio of costs to revenues? (table)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Ratio of Cost: Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.43:1.00</td>
</tr>
<tr>
<td>2011</td>
<td>0.45:1.00</td>
</tr>
<tr>
<td>2012</td>
<td>0.46:1.00</td>
</tr>
</tbody>
</table>

The ratio ranges between .43:1.0 and .46:1.0, reflecting a decent profit margin for the program. It did become slightly more costly as the number of students in the recent two cohorts had decreased.

c. What investment in new resources does the program require? (200 words)

The program requires three investments from the university. First, the department needs secretarial support to cover the office. Student inquiries go unanswered for days over summer and non-academic semesters. Second, for the past few cohorts, students have difficulties completing their graduate applications due to University administrative disorganization. It is not uncommon for students to have to send multiple copies of transcripts and have difficulties filing paperwork with the health forms over the summer. Since the cohort begins in the fall, we have experienced either losing students to other universities or having one or two who cannot get matriculated in a timely fashion, and thus begin as part time students. Third, the Graduate Studies Office needs a budget for advertising and recruitment for this and other graduate programs. In recent years, we have been losing many graduate students to neighboring universities because of their marketing initiatives. SCSU has no media exposure and this is hurting the graduate programs at the University significantly. An investment in advertising and a streamline process for all university students would greatly impact our graduate programs as a whole.

d. What demonstrable efficiencies exist in the way the program is operated (e.g., summer courses; cross-listed courses, etc.)? (100 words)

Faculty teaching in the ISIS program do an incredible job recruiting top scientists to present in the program. Scientists including Nobel Laureates, forensic chiefs, laboratory directors, policy makers, authors and journalists often present out of appreciation of the role a science teacher had on them or because they appreciate the important role these teachers have in inspiring the next generation of scientists. The program does cover some transportation costs for students for the trip to Washington, however students pick up their own food and lodging.
ISIS teachers register for 3-6 credits each summer. We do not offer intersession courses.

9) **Impact, justification, and overall essentiality of the program**

a. How does this program connect to the University’s mission statement and/or the Graduate School’s mission statement? (100 words)

SCSU’s mission statement highlights the pursuit of excellence, fostering leadership and the empowering of communities. ISIS reflects these goals perfectly. ISIS engages some of the top scientists in the country to share issues and challenges in science with ISIS participants. Participants, through their mentorships and writing experiences, become science leaders in their schools. These teachers are knowledgeable, skilled practitioners prepared to address current and future challenges in the field of science education (per the Graduate Studies mission). They prepare their students to work and live in a world increasingly dependent on advances in science and scientific research.

b. How does this program respond to societal needs that the institution values? (e.g., producing a critical thinking, educated citizenry; improving the state’s workforce; meeting health care needs of the community, etc.)? (100 words)

ISIS participants teach over 100 students a day. They share their knowledge about directions in science, and teach the skills and knowledge necessary to appreciate and understand the major scientific challenges of today. Having the experience of interacting with the scientists researching these issues, empowers them to bring to their classrooms a unique preparation and supported perspectives. This perspective will enlighten Connecticut students and make them aware of the potential careers in science that are available. These participants will prepare a well-informed citizenry and next generation who can appreciate the value and excitement of science.

c. To what extent does this program help the institution differentiate itself from similar programs at peer institutions? (100 words)

To the best of our knowledge there are no Sixth-Year Programs in Science Education in Connecticut or possibly anywhere in the country that engage science educators directly with researchers in a cohort program. Although other universities offer a Sixth Year certificate or Master’s Degree in STEM based topics, ISIS provides a rare opportunity to learn science (from researchers in the field), do science (in mentorships) and communicate science (through curricular assignment and writing for publication).

d. Is there anything else you would like us to know? (100 words)
ISIS is an exceptional program. It has been awarded an NSF grant, a Silver Award for Innovation in Connecticut, and is recognized and supported (academically) by some of the leading science and science education institutions in the country. Recently we have struggled in our recruitment initiatives, as we are limited in advertisement and outreach support. We are working to align ISIS with a STEM concentration in SCSU’s Ed.D. Program. We are also actively pursuing strategies for extending our reach throughout New England. We are a small department (5 faculty) with little secretarial support, four graduate programs and two undergraduate minors.

10) **Opportunity analysis of the program**

a. **Describe the external opportunities for strengthening your program. (300 words)**

There are a number of external opportunities that the program currently capitalizes on in order to benefit our students, e.g. finding employment, assisting in placing student teachers, and inviting classroom speakers for the ISIS program. In a small state like Connecticut, the science education community is well established and our alumni are employed in many teaching positions around the state. The one area where the program could help strengthen its reputation is by having a larger presence in the State. This can be accomplished through interaction with professional organizations other than educational organization, writing collaborative grants with K-12 schools, and identifying science-based industries and corporations that may support STEM based outreach projects involving SCSU faculty and students. We need to get our name out to a variety of organization to show them the strengths of the students in our programs.

Another opportunity would be the creation of professional development schools (PDS) in our urban, suburban, and rural communities. The PDS model is based on the Holmes Model of Simultaneous renewal where school districts and universities partner together to strengthen each other. The partnership between the university and the school district ensures simultaneous renewal by providing venues to support both entities students and faculty. Currently SCSU does not have formalized agreements with local districts and this has been a deficit in creating strong local partnerships.

b. **Describe the internal opportunities for strengthening your program. (300 words)**

There are two significant opportunities for strengthening ISIS. First, there has been discussion in the development of a joint initiative between the science education faculty and the education leadership faculty to offer a STEM education concentration in the Ed.D. Program. Through this initiative, students in the ISIS program could
enroll and take courses in the Ed.D. program furthering their aspirations in STEM education. This opportunity might replace the summer mentorship with a clinical research project in support of the student’s dissertation. This may also encourage students currently enrolled to continue their studies in the Ed.D. Historically students interested in pursuing a doctoral degree have attended Columbia, University of Connecticut or University of Massachusetts. With the current emphasis on STEM education in K-12 education, the opportunity to have STEM trained administrators would create a unique role for SCSU.

A second opportunity relates to inconsistencies in course load credit when coordinating graduate programs at SCSU. The lack of graduate coordinator reassigned time has placed unnecessary work overload on faculty in the department and has resulted in a significant disadvantage for all parties. There are three graduate programs in the department. The University has shunned this department with regard to resources for a long time. From 1994 to 2010, one faculty member coordinated all three programs in addition to her 12-credit teaching load. In 2010, the responsibility for coordinating graduate program was divided between three faculty members, but still no credit was given to these faculty members for the extra workload. There appears to be no consistent or transparent venue for the allocation of graduate coordinator release time across the university. This would greatly strengthen our graduate programs if time were provided to allow faculty to develop new activities/initiatives, develop collaborative relationships within and outside the University, and to develop recruitment materials.