Senate Bill 1516-06

UNIVERSITY SENATE

UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

Introduced by: Graduate Academic Council
University Planning and Policy Council

Date: May 9, 2016

PROPOSAL TO ESTABLISH A GRADUATE CERTIFICATE PROGRAM IN COMPUTING EDUCATION

IT IS HEREBY PROPOSED THAT THE FOLLOWING BE ADOPTED:

1. That the University Senate approves the attached proposal to establish a graduate certificate program in Computing Education as approved by the Graduate Academic Council (4/6/16) and University Planning and Policy Council (4/24/16).

2. That this proposal be forwarded to the President for approval.

New Program Proposal:
Certificate or Advanced Certificate Program

Form 2C

This form should be used to seek SUNY's approval and the State Education Department's (SED) registration of a proposed new academic program leading to a certificate (undergraduate) or an advanced certificate (graduate). Approval and registration are both required before a proposed program can be promoted or advertised, or can enroll students. The campus Chief Executive or Chief Academic Officer should send **a signed cover letter and this completed form** (unless a different form applies[1]), which should include **appended items** that may be required for Sections 1 through 3 and Section 10 of this form to the SUNY Provost at program.review@suny.edu. The completed form and appended items should be sent as a single, continuously paginated document.[2] Guidance on academic program planning is available at http://www.suny.edu/provost/academic_affairs/app/main.cfm.

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NOTE: Please update this Table of Contents automatically after the form has been completed. *To do this, put the cursor anywhere over the Table of Contents, right click, and, on the pop-up menus, select "Update Field" and then "Update Page Numbers Only." The last item in the Table of Contents is the List of Appended and/or Accompanying Items, but the actual appended items should continue the pagination.*

[1]Use a different form if the proposed new program will lead to a degree; be a combination of existing registered programs (i.e. for a multi-award or multi-institution program); be a breakout of a registered track or option in an existing registered program; or lead to certification as a classroom teacher, school or district leader, or pupil personnel services professional (e.g., school counselor).

[2]This email address limits attachments to 25 MB. If a file with the proposal and appended materials exceeds that limit, it should be emailed in parts.

Section 1. General Information		
Item	**Response *(type in the requested information)***	
a) Institutional Information	Date of Proposal:	December 10, 2015
	Institution's 6-digit SED Code:	**210500**
	Institution's Name:	University at Albany
	Address:	*1400 Washington Avenue, Albany, NY 12222*
	Dept of Labor/Regent's Region:	*Capital Region*
b) Program Locations	List each campus where the entire program will be offered (with each institutional or branch campus 6-digit SED Code): **210500**	
	List the name and address of off-campus locations (i.e., extension sites or extension centers) where courses will offered, **or check here [X] if not applicable**:	
c) Proposed Program Information	Program Title:	Certificate of Graduate Study in Computing Education (CCE Online)
	Award(s) (e.g., Certificate):	Advanced Certificate
	Number of Required Credits:	Minimum [15] If tracks or options, largest minimum [ ]
	Proposed HEGIS Code:	0829.00
	Proposed 6-digit CIP 2010 Code:	13.1321
	If the program will be accredited, list the accrediting agency and expected date of accreditation:	
	If applicable, list the SED professional licensure title(s)[3] to which the program leads:	
d) Contact Person for This Proposal	Name and title: Peter Shea, Associate Provost for Online Learning Telephone: 518-852-1904 E-mail: pshea@albany.edu	
e) Chief Executive or Chief Academic Officer Approval	**Signature affirms that the proposal has met all applicable campus administrative and shared governance procedures for consultation, and the institution's commitment to support the proposed program.** ***E-signatures are acceptable.*** Name and title: James Stellar, Senior Vice President for Academic Affairs and Provost Signature and date:	
	If the program will be registered jointly[4] with one or more other institutions, provide the following information for <u>each</u> institution:	
	Partner institution's name and 6-digit SED Code: Name and title of partner institution's CEO: Signature of partner institution's CEO (or **append** a signed letter indicating approval of this proposal):	

Version 2013-10-17

[3] If the proposed program leads to a professional license, a specialized form for the specific profession may need to accompany this proposal.
[4] If the partner institution is non-degree-granting, see SED's CEO Memo 94-04.

Section 2. Program Information

2.1. Program Format

Check all SED-defined format, mode and other program features that apply to the **entire program**.

a) Format(s): [ ]Day [ ]Evening [ ]Weekend [ ]Evening/Weekend [ ]Not Full-Time

b) Modes: [ ]Standard [ ]Independent Study [ ]External [ ]Accelerated [X]Distance Education
NOTE: *If the program is designed to enable students to complete 50% or more of the course requirements through distance education, check Distance Education, see Section 10, and append a Distance Education Format Proposal.*

c) Other: [ ] Bilingual [ ] Language Other Than English [ ] Upper Division [ ] Cooperative [ ] 4.5 year [ ] 5 year

2.2. Related Degree Programs

All coursework required for completion of the certificate or advanced certificate program must be applicable to a currently registered degree program at the institution (with the possible exception of post-doctoral certificates in health-related fields). Indicate the registered degree program(s) by title, award and five-digit SED Inventory of Registered Programs (IRP) code to which the credits will apply:

Curriculum and Instruction PhD 13788

Curriculum Development and Instructional Technology (CDIT) MS13786

Online Learning and Teaching (COLT) Certificate 35084

Curriculum and Instruction Certificate 13787

Information Science MS 28819

2.3 Program Description, Purposes and Planning

a) What is the description of the program as it will appear in the institution's catalog?

The Certificate in Computing Education program (CCE) is designed to address the needs of qualified teachers who can deliver effective and engaging curricula in computer science and (or) introducing computational thinking (as a new literacy) to K-12 students. This will be the first graduate certificate program in computing education in the State of New York. This program is designed for students who wish to gain critical conceptual knowledge as well as advanced practical skills in how to teach computing courses, and introducing computational thinking to young learners through integrating computational thinking into their home subjects. All courses in the CCE Program are applicable to the Masters Degree in CDIT.

b) What are the program's educational and, if appropriate, career objectives, and the program's primary student learning outcomes (SLOs)? ***NOTE:*** *SLOs are defined by the Middle States Commission on Higher Education in the Characteristics of Excellence in Higher Education as "clearly articulated written statements, expressed in observable terms, of key learning outcomes: the knowledge, skills and competencies that students are expected to exhibit upon completion of the program."*

Students who complete this program will be able to meet the International Society for Technology in Education (ISTE) Standards for Computer Science Educators (http://www.iste.org/docs/pdfs/20-14_iste_standards-cse_pdf.pdf). Students will demonstrate knowledge, skills and competencies in teaching computational thinking and introductory computer science courses at the K-12 level (e.g., Exploring Computer Science and Computer Science Principles). Examples of these learning outcomes are:

In keeping with the ISTE Standards for Computer Science Educators our students will be able to:

- Plan and teach computer science lessons/units using effective and engaging practices and methodologies
- Design environments that promote effective teaching and learning in computer science classrooms and online learning environments and promote digital citizenship
- Participate in, promote, and model ongoing professional development and life-long learning relative to computer science and computer science education

Our student will also have the following proficiencies themselves and demonstrate the ability to design learning environments in developmentally appropriate ways that allow students at various levels in pre-college settings to

- Demonstrate knowledge of and proficiency in data representation and abstraction
- Effectively design, develop, and test algorithms
- Demonstrate knowledge of digital devices, systems, and networks
- Demonstrate an understanding of the role computer science plays and its impact in the modern world

More specifically, students in this program (with the majority expected to be K-12 teachers) will also be able to

- Understand the central concepts of computer science principles (CSP) outlined in the CSP curriculum framework (e.g., understand how the Internet works, how computing has impacted innovations in other fields, the beneficial and harmful effects to people and society brought on by computing innovations, internet ethics and security, etc.)
- Apply computational thinking skills (e.g., build computational artifacts, analyze data and information) to solve real world problems at the AP course level (e.g., design a mobile app to monitor diet for diabetics)
- Communicate using computer science terminology and vocabulary
- Understand unique challenges and opportunities of introducing computer science and computational thinking to young learners
- Actively recruit traditionally underrepresented students in computing classes (e.g., run an Hour of Code activity for recruiting)
- Understand and apply a variety of methods and tools to engage students into computational thinking and computational explorations (e.g., using the CS Un-Plugged method to engage students in computational thinking practices without a computer)
- Understand the essential role of computational thinking in scientific explorations broadly and integrate computational thinking into the learning of other subjects (e.g., teach how to create/modify a computational model or simulation of a science phenomenon in a science class)
- Demonstrate a sense of confidence in teaching computational thinking and introductory computer sciences courses

c) How does the program relate to the institution's and SUNY's mission and strategic goals and priorities? What is the program's importance to the institution, and its relationship to existing and/or projected programs and its expected impact on them? As applicable, how does the program reflect diversity and/or international perspectives?

The new graduate certificate in computing education program fits well both into institutional goals and departmental goals. First, computer science and the technologies it enables now lie at the heart of our economy, our daily lives, and scientific enterprise. Computational thinking has become the new literacy for students to thrive in this new global information society. Computational thinking is defined as a process that generalizes a solution to open ended problems. Computational thinking can be empowered by computing technologies, but can be demonstrated across many subjects beyond computer science. For example, the Next Generation Science Standards has included computational thinking as one of the eight essential pieces of science and engineering. Recently, new computer science courses that represent the key ideas of computational thinking and computer science for all are being offered in schools nationwide. Moreover, the College Board collaborating with the National Science Foundation has developed a new Advanced Placement course in computer science (AP CS Principles) and has begun to offer the exam in May 2017. Meanwhile, it is also an important strategic goal of SUNY to grow capacities to serve the high needs of information technology and computing technology-related employment. The Computing Education

Certificate program is dedicated to preparing teachers to engage students earlier in information technology and computer science as well as the new literacy of computational thinking. The program thus has the potential to impact the pipeline of students in these fields as well as to develop well-educated citizens with computational thinking literacy.

Second, another strategic goal of SUNY is to promote online learning and to increase the numbers of students graduating across SUNY. Through this proposal the University at Albany will broaden its online offerings to help advance SUNY's strategic goals in this area.

The proposal reflects two priority areas for advancing the University:
1) The proposal seeks to develop an online program that expands existing offerings.
First, the CCE program will become the first graduate certificate program in computing education in the State of New York. Although computing courses are being offered in a variety of ways at schools, there is no existing certificate program created to prepare and train teachers to provide quality teaching of those courses, not to mention integrating computational thinking into core curriculum. This program provides new offerings for in-service teachers who are interested to introduce computational thinking and computer science among K-12 students. One of the courses in this graduate certificate program will be new: ETAP 540 will be a new course modified based on an offering in the Informatics Department, to further develop fundamental knowledge of computer science principles & computational thinking skills and prepare teachers to teach the new AP Computer Science Principles course. One course (ETAP 652C) will be significantly redeveloped. ETAP 652C Teaching Computing in the Secondary School serves as an introductory methods course for teaching computational thinking and computer science. This program also offers courses for in-service teachers to improve their teaching through integrating computational thinking into current core curriculum, such as the two courses with a computer game focus (ETAP 534 Introduction to Games for Learning: Theory and Practice and ETAP 535 Introduction to Game Design for Educators) and the courses with an integration focus (ETAP 650 Educational Computing in the Math/Science Class and ETAP 526 Educational Computing). These courses also expand existing offerings of the CDIT program and COLT program for new learning needs.

2) The new certificate program utilizes online and distance learning for reaching new student populations. It will serve in-service teachers who otherwise may not come to the University at Albany because their full time job restricts their possibility of attending face-to-face courses. We believe with new courses offered in this program, it will also be attractive to current CDIT Masters students as well as reach new audience not currently enrolled including IT/CS graduates who are interested in a pathway to K-12 teaching.

d) How were faculty involved in the program's design?

Faculty members of the Department of Educational Theory and Practice and the Informatics Department actively participated in the planning process as a collaborative team. The whole team had monthly meetings to discuss and work through details of the program. The design of this program integrates expertise from faculty at the two departments including research areas from new hires (e.g., online teaching and learning, computational thinking in science and math education, educational game, etc.) We have also reached out to administrators and teachers from the Capital Region for feedbacks to better understand and serve teachers' needs through events organized by CASDA (Capital Area School Development Association).

e) How did input, if any, from external partners (e.g., educational institutions and employers) or standards influence the program's design? If the program is designed to meet specialized accreditation or other external standards, such as the educational requirements in Commissioner's Regulations for the profession, **append** a side-by-side chart to show how the program's components meet those external standards. If SED's Office of the Professions requires a specialized form for the profession to which the proposed program leads, **append** a completed form at the end of this document.

This program is informed by recent developments at the Federal and State levels indicating an increased need for computer science education in pre-college settings. For example, the Obama administration recently announced it was:

- Providing $4 billion in funding for states, and $100 million directly for districts in his forthcoming Budget to increase access to K-12 CS by training teachers, expanding access to high-quality instructional materials, and building effective regional partnerships. The funding will allow more states and districts to offer hands-on CS courses across all of their public high schools, get students involved early by creating high-quality CS

learning opportunities in elementary and middle schools, expand overall access to rigorous science, technology, engineering and math (STEM) coursework, and ensure all students have the chance to participate, including girls and underrepresented minorities.

- Starting the effort this year, with more than $135 million in investments by the National Science Foundation (NSF) and the Corporation for National and Community Service (CNCS) to support and train CS teachers, who are the most critical ingredient to offering CS education in schools.
- Calling on even more Governors, Mayors, education leaders, CEOs, philanthropists, creative media and technology professionals, and others to get involved. Today, Delaware, Hawaii and more than 30 school districts are committing to expand CS opportunities; Cartoon Network, Google and Salesforce.org are announcing more than $60 million in new philanthropic investments, and Microsoft is announcing a fifty-state campaign to expand CS; and Code.org is announcing plans to offer CS training to an additional 25,000 teachers this year.

This proposal is also a direct outcome of the SUNY High Need grant program and has been vetted to address the needs of employers in New York State through its selection for funding. Part of the rationale for this proposal is to begin to address the needs of the information technology and computer industries earlier in the educational pipeline. We suggest that developing programs that prepare teachers to be more effective in helping students prior to college is essential to addressing the needs of employers in later years.

f) Enter anticipated enrollments for Years 1 through 5 in the table below. How were they determined, and what assumptions were used? What contingencies exist if anticipated enrollments are not achieved?

Year	Anticipated Headcount Enrollment			Estimated FTE
	Full-time	Part-time	Total	
1	5-7	5-8	10-15	
2	7-8	8-10	15-18	
3	7-8	10-12	17-20	
4	7-8	10-12	17-20	
5	8-10	12-15	20-25	

Calculating the headcount we took into consideration our existing enrollment in the CDIT M.S. program and the growing need for computing teachers in New York as new computer science courses are being offered in schools nationwide. For example, the City of New York's Computer Science for All initiative (CSNYC) is aimed at offering one unit of computer science at each level from elementary to high school by 2025, which needs to train 4775 teachers, for 245,000 students over the next 10 years. The CCE program targets mainly students who will do the program part time because of their full-time teacher obligations. The program is a self-sustaining addition to existing offerings in the Department of Educational Theory and Practice and the Informatics Department.

g) Outline all curricular requirements for the proposed program, including prerequisite, core, specialization (track, concentration), capstone, and any other relevant component requirements, but do not list each General Education course.

This program consists of five courses offered entirely online, including three required courses (9 credits) and two electives (6 credits).

Three Required Courses (9 Credits):
ETAP 652C Teaching Computing in the Secondary School (3)
This course provides an overview of current research, theory and practice in K-12 computing education. This course will introduce the concept of computational thinking as a fundamental skill for the 21st century and offer technical and pedagogical skills to teach and integrate computational concepts and computational thinking at the K-12 level. The course modules include field orientation (the field of computer science, computational thinking and the current state of K-12 computing education), outreach, recruitment and retention in computing, computing curriculum and standards, engaging students in computing- teaching methods and programming tools, assessment of learning in computing, integrating computing into traditional subjects, and computing teacher professional development and communities.

ETAP 540 Learning and Teaching Computer Science Principles (3)
This course will help educators develop foundational computational thinking skills, an understanding of the real-world impact of computing applications and programming literacy. The course will present the Big Ideas of computer science principles (abstraction, algorithms, creativity, data, impact, internet and programming) with strategies for teaching those topics. It translates to a mechanism to help teachers to prepare students for the forthcoming Advanced Placement Computer Science Principles course.

ETAP 650 Educational Computing in the Math/Science Class (3)
Extended skills in the use of computing for the teaching and learning of mathematics or science. For the mathematics or science teacher seeking to learn strategies for the integration of computers and other IT into educational practice. Individual projects and laboratory experiences.

Two electives from the following courses (students are able to pick one of the four concentrations, a combination of those courses, or other special topics offered at the two departments based on students' needs and faculty advice):

A. Computer Game
ETAP 534 Introduction to Games for Learning: Theory and Practice (3)
Introduction to Games for Learning: Theory and Practice will introduce educators to theory, research, and practice in the use of games for learning. Well-designed games can change the way learning occurs, making it both more engaging and effective. Not all games are well designed, and this course will review principles of good game design and good learning. We will also look at research supporting the utility of games as well as examples of how to design games for learning. Students will select, play, and review educational games. Along the way, the course will help students understand the very real potential of games, simulations, and immersive environments to transform education and model computational thinking.

ETAP 535 Introduction to Game Design for Educators
In Introduction to Game Design for Educators, students will utilize game programming software in order to create a unique educational game that can be used within the classroom. Students will learn about best practices for game design from renowned game designers. Students will also read educational research pertaining to benefits of using games in the classroom, computational thinking, and empowering students through game design. The goals of this course are to prepare in-service teachers and other educators to teach game design in their own classrooms and promote habits of mind and skills reflecting computer science principles. This is a fully asynchronous, online, collaborative course.

B. Computing
ETAP 526 Educational Computing (3)
Overview of computing in education; introduction to computer software, application packages, programming, hypermedia, and telecommunications. This course focuses on the application of computing in education, introduction to computer software packages, computer-based learning environments, hypermedia, computer scaffolding and collaboration tools, and telecommunications.

INF 596 Special Topics in Informatics/CS (3)
The content of this course will vary from semester to semester. Each offering will cover an advanced topic in Informatics/Computer Science. Introductory programming in Python/Java will be one topic for students in the CCE certificate program. Gaming reality will be another topic.

C. Instructional Technology
ETAP 628 Instructional Design for Technology
Principles of instructional design for use with the microcomputer and other electronic media. No technical background required. Focus on concepts in instructional design and practical application to instructional technology.

ETAP 639 K-12 Online Teaching and Learning
This course is an introduction to K-12 online teaching and learning. This course targets current theory and pedagogy for teaching K-12 students. Throughout the course, you will complete several tasks. You will read literature pertinent to K-12 online teaching and learning. You will discuss challenges online teachers and students face, teaching and learning techniques, and best practices for online course development. Additionally, you will learn about and use

technologies used to successfully teach in online environments. You will have small projects throughout the course covering different forms of online learning in the K-12 setting.

D. Other Special Topics

Students can work with their advisors to choose other electives offered at the two departments that meet their learning needs. For example, students who wish to enhance their general pedagogy knowledge can take the online course ETAP 621 Understanding Learning and Teaching course.

h) Program Impact on SUNY and New York State

h)(1) ***Need:*** What is the need for the proposed program in terms of the clientele it will serve and the educational and/or economic needs of the area and New York State? How was need determined? Why are similar programs, if any, not meeting the need?

Federal and State initiatives indicate a significant opportunity to develop new teachers to provide instruction in computer science in pre-college settings. Nationally estimates suggest tens of thousands of teachers will need training (https://www.whitehouse.gov/the-press-office/2016/01/30/fact-sheet-president-obama-announces-computer-science-all-initiative-0) . In New York City stated goals are to train 5000 teachers in ten years (http://www.csnyc.org/computer-science-all) , implying that approximately 2500 NYC teachers will need training within five years.

This program is designed to meet a portion of these needs and provide a new pathway to continuing education certification required of teachers in the New York State. It targets in-service teachers and other interested parties widely (e.g., IT/CS majors who are interested in learning about teaching computing courses at K-12).

Computer science and the technologies it enables now lie at the heart of our economy, our daily lives, and scientific enterprise. Computational thinking has become the new literacy for students to thrive in this new global information society. A national effort is underway to increase the teaching of Computer Science at the K-12 level. New computer science courses are being offered in schools nationwide to introduce students to computational thinking literacy (e.g., the Computer Science Principles as a new AP course, starting from Fall 2016). A few big cities in the USA including the City of New York have signed the commitment to offering computer science courses to EVERY school. In NY State, the New York State Department of Labor also makes clear that demand for Computer Science and Information Technology and computing related professionals is projected to grow. We need k-12 educators who are prepared and better able to engage students in computing in ways that that will help prepare and expand this pool. Increasing the pool of prepared, interested and engaged students for these professionals requires that we start earlier in the educational pipeline.

Currently, the New York State Department of Education lists no graduate certificate programs which have as an explicit goal the preparation of educators to serve in this role (see http://www.nysed.gov/COMS/RP090/IRP2BB). While related programs exist, they emphasize other fields including educational technology, learning technology, or instructional technology, but no institution of higher education in New York currently offers the proposed Certificate in Computing Education.

In preparing this proposal in addition to satisfying demands for the SUNY High Needs criteria indicating demand we also solicited input from Capital Area School Superintendents and New York State Master Teachers and other constituencies through formal and informal presentations and communications. There was a great deal of support for the program and feedback from these parties informed the current design of the proposed program.

h)(2) ***Employment:*** For programs designed to prepare graduates for immediate employment, use the table below to list potential employers of graduates that have requested establishment of the program and describe their specific employment needs. If letters from employers support the program, they may be **appended** at the end of this form. As appropriate, address how the program will respond to evolving federal policy on the "gainful employment" of graduates of certificate programs whose students are eligible for federal student assistance.

Estimates below are conservative projections on numbers of teachers requiring training to advance or retain careers.

They assume that many teachers who need training will already have positions. A single program funded by the National Science Foundation (CS10K - one of many such programs providing funding at state and federal levels) has as a goal of the training at least 10,000 Computer Science teachers nationally by 2020.

Employer	*Need: Projected positions*	
	In initial year	**In fifth year**
New York City Public Schools	250	2500
National estimates	500	10,000
Capital District estimates	25	100

h)(3) ***Similar Programs:*** Use the table below to list similar programs at other institutions, public and independent, in the service area, region and state, as appropriate. Expand the table as needed. ***NOTE:*** *Detailed program-level information for SUNY institutions is available in the Academic Program Enterprise System (APES) or Academic Program Dashboards. Institutional research and information security officers at your campus should be able to help provide access to these password-protected sites. For non-SUNY programs, program titles and degree information – but no enrollment data – is available from SED's Inventory of Registered Programs.*

Institution	Program Title	Degree	Enrollment
Purdue University	Computer Science Teaching Supplemental Licensure Program	Certificate	N/A
The College of St. Scholastica	Online Certificate in Computer Science Education	Certificate	N/A
University of Colorado Denver	Computer Science Teacher Education	Certificate	N/A

h)(4) **C*ollaboration:*** Did this program's design benefit from consultation with other SUNY campuses? If so, what was that consultation and its result?
N/A

h)(5) ***Concerns or Objections:*** If concerns and/or objections were raised by other SUNY campuses, how were they resolved?
N/A

2.4. Admissions

a) What are all admission requirements for students in this program? Please note those that differ from the institution's minimum admissions requirements and explain why they differ.

- Must hold a Bachelors degree from an accredited college or university.
- Official transcripts
- 3.0 GPA
- 3 Letters of recommendation
- Statement of goals

b) What is the process for evaluating exceptions to those requirements?

N/A

c) How will the institution encourage enrollment in this program by persons from groups historically underrepresented in the institution, discipline or occupation?

A key goal of the program is to increase the quality of instruction around computation and information technologies to all students, especially those who may be historically underrepresented in the computing disciplines and professions, including women, persons with disabilities, and minorities. It is clear that participation rates by women and minorities in

computer science are among the lowest of any scientific field. For example, in 2008, only 17% of advanced placement (AP) computer science test takers were women, even though women represented 55% of all AP test takers. Participation in computer science AP tests among underrepresented minorities has increased during the past 10 years, but is only at 11%, compared to 19% of all AP test takers (College Board, 2009).

This program will help to address this issue by preparing teachers who understand this issue and have knowledge and skills of recruiting and engaging those students. This program offers courses informed by the most recent research and practices in K-12 computing education that welcome every student and engage them in computational thinking practices. Students (K-12 teachers) in this certificate program will gain fundamental knowledge and skills in recruiting and engaging learners from the communities with longstanding underrepresentation in computing. For example, through the ETAP 652C course, students will understand the issues of under-representation in computing. Students will know available resources that support students with disabilities in computing. Students will be able to apply some strategies to attract girls and minorities into computing class (e.g., engage girls into solving social/culturally relevant problems with computation, or provide inspiring role models of computing professionals from under-representative groups).

2.5. Academic and Other Support Services

Summarize the academic advising and support services available to help students succeed in the program.

Each student in the program will be assigned an academic advisor who is a full-time faculty member in the Department of Educational Theory and Practice. Students will receive advisement during the entire length of their enrollment in the program. The University has numerous support services including a Writing Center, support for non-native speakers of English, and computer and technology support through a 24/7 helpdesk. The School of Education also provides support through its Pathways into Education Center (PIE) for new, part-time, and non-matriculated students.

2.6. Prior Learning Assessment

If this program will grant credit based on Prior Learning Assessment, describe the methods of evaluating the learning and the maximum number of credits allowed, **or check here [X] if not applicable**.

2.7. Program Assessment and Improvement

Describe how this program's achievement of its objectives will be assessed, in accordance with *SUNY policy*, including the date of the program's initial assessment and the length (in years) of the assessment cycle. Explain plans for assessing achievement of students' learning outcomes during the program and success after completion of the program. **Append** at the end of this form, **a plan or curriculum map** showing the courses in which the program's educational and, if appropriate, career objectives – from Item 2.3(b) of this form – will be taught and assessed. ***NOTE:*** *The University Faculty Senate's Guide for the Evaluation of Undergraduate Programs is a helpful reference.*

The first assessment will take place two years after the program begins. After that there will be a bi-annual assessment cycle. Learning outcomes will be assessed on the basis of the following information:
1) GPA of students in the program.
2) Students will be asked to submit a written evaluation of the program anonymously after completing the program.
3) Participating faculty will discuss the quality of final examination results and term papers in a meeting.
4) Interviews with 5 randomly selected graduates.
5) Information about placement of graduates and their move in the profession within two years' time.

Section 3. Sample Program Schedule and Curriculum

Complete the **SUNY Program Schedule for Certificate and Advanced Certificate Programs** to show how a typical student may progress through the program.

NOTE: *For an undergraduate certificate program, the* ***SUNY Sample Program Schedule for Certificate and Advanced Certificate Programs*** *must show* ***all curricular requirements and the number of terms required to complete them.*** *Certificate programs* ***are not required*** *to conform to SUNY's and SED's policies on credit limits, general education, transfer and liberal arts and sciences.*

EXAMPLE FOR ONE TERM: Sample Program Schedule for Certificate Program

Term 2: Fall 20xx			
Course Number & Title	**Cr**	**New**	**Prerequisite(s)**
ACC 101 Principles of Accounting	4		
MAT 111 College Mathematics	3		MAT 110
CMP 101 Introduction to Computers	3		
HUM 110 Speech	3	X	
ENG 113 English 102	3		
Term credit total:	16		

NOTE: *For a graduate advanced certificate program, the* ***SUNY Sample Program Schedule for Certificate and Advanced Certificate Programs*** *must include all curriculum requirements. The program is* ***not required*** *to conform with*

the graduate program expectations from Part 52.2(c)(8) through (10) of the Regulations of the Commissioner of Education.

a) If the program has fewer than 24 credit hours, or if the program will be offered through a nontraditional schedule (i.e., not on a semester calendar), what is the schedule and how does it impact financial aid eligibility? ***NOTE:*** *Consult with your campus financial aid administrator for information about nontraditional schedules and financial aid eligibility.*

Students in the program will not be eligible for financial aid.

b) For each existing course that is part of the proposed undergraduate certificate or the graduate advanced certificate, append, at the end of this form, a catalog description.

c) For **each new course** in the certificate or advanced certificate program, **append a syllabus** at the end of this document.

d) If the program requires external instruction, such as clinical or field experience, agency placement, an internship, fieldwork, or cooperative education, **append** a completed External Instruction form at the end of this document.

SUNY Sample Program Schedule for Certificate and Advanced Certificate Programs

Program/Track Title and Award: Advanced Certificate in Computing Education

a) Indicate **academic calendar type**: [X] Semester [ ] Quarter [ ] Trimester [ ] Other (describe):

b) **Label each term in sequence**, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2)

c) Use the table to show **how a typical student may progress through the program**; copy/expand the table as needed. **Complete all columns that apply to a course.**

Certificate of Graduate Study in Computing Education (CCE Online)

Term 1:				**Term 2:**			
Course Number & Title	**Credits**	**New (X)**	**Co/Prerequisites**	**Course Number & Title**	**Credits**	**New (x)**	**Co/Prerequisites**
ETAP 652C Teaching Computing in the Secondary School	3	x		ETAP 650 Educational Computing in the Math/Science Class	3		
ETAP 540 Learning and Teaching Computer Science Principles	3			ETAP 534 Introduction to Games for Learning: Theory and Practice	3		
Term credit totals:	6			**Term credit totals:**	6		
Term 3:				**Term 4:**			
Course Number & Title	**Credits**	**New (X)**	**Co/Prerequisites**	**Course Number & Title**	**Credits**	**New (X)**	**Co/Prerequisites**
ETAP 535 Introduction to Game Design for Educators	3						
Term credit totals:	**3**			**Term credit totals:**			

Program Totals (in credits):	**Total Credits: 15**

Section 4. Faculty

a) Complete the **SUNY Faculty Table** on the next page to describe current faculty and to-be-hired (TBH) faculty.

b) **Append** at the end of this document position descriptions or announcements for each to-be-hired faculty member.

NOTE: *CVs for all faculty should be available upon request. Faculty CVs should include rank and employment status, educational and employment background, professional affiliations and activities, important awards and recognition, publications (noting refereed journal articles), and brief descriptions of research and other externally funded projects. New York State's requirements for faculty qualifications are in Part 55.2(b) of the Regulations of the Commissioner of Education.*

c) What is the institution's definition of "full-time" faculty?

Full time faculty status is granted to those holding an appointment with 100% time commitment. For a faculty member participating in doctoral level work and research, a full-time teaching load is two courses per semester.

SUNY Faculty Table

Provide information on current and prospective faculty members (identifying those at off-campus locations) who will be expected to teach any course in the graduate program. Expand the table as needed. Use a separate Faculty Table for each institution if the program is a multi-institution program.

(a)	(b)	(c)	(d)	(e)	(f)
Faculty Member Name and Title/Rank (Include and identify Program Director with an asterisk.)	**% of Time Dedicated to This Program**	**Program Courses Which May Be Taught (Number and Title)**	**Highest and Other Applicable Earned Degrees (include College or University)**	**Discipline(s) of Highest and Other Applicable Earned Degrees**	**Additional Qualifications: List related certifications, licenses and professional experience in field.**
PART 1. Full-Time Faculty					
Peter Shea*	5%	ETAP 639 K-12 Online Teaching and Learning	PhD	Curriculum and Instruction	Associate Provost for Online Learning
Reza Feyzi Behnagh	10%	ETAP 526 Educational Computing	PhD	Educational Psychology, Learning Sciences	
George Berg	5%	ETAP 540 Learning and Teaching Computer Science Principles	PhD	Computer Science	
Jennifer Goodall	5%	INF 596 Special Topics in Informatics	PhD	Information Science	Director for Women in Technology
Alandeom Oliveira	5%	ETAP 650 Educational Computing in the Math/Science Class	PhD	Science Education	
Caro Williams-Pierce	10%	ETAP 534 Introduction to Games for Learning: Theory and Practice	M.A.	Mathematics and Education	Doctoral Candidate in Mathematics Education
Jason Vickers	10%	ETAP 535 Introduction to Game Design for Educators	PhD	Curriculum and Instruction	
JianWei Zhang	5%	ETAP 628 Instructional Design for Technology	PhD	Educational Psychology	
Part 2. Part-Time Faculty					
Lijun Ni	17%	ETAP 652C Teaching Computing in the Secondary Schools	PhD	Human-Centered Computing	Computing Education Research

(a)	(b)	(c)	(d)	(e)	(f)
Faculty Member Name and Title/Rank (Include and identify Program Director with an asterisk.)	**% of Time Dedicated to This Program**	**Program Courses Which May Be Taught (Number and Title)**	**Highest and Other Applicable Earned Degrees (include College or University)**	**Discipline(s) of Highest and Other Applicable Earned Degrees**	**Additional Qualifications: List related certifications, licenses and professional experience in field.**
Part 3. Faculty To-Be-Hired (List as TBH1, TBH2, etc., and provide title/rank and expected hiring date.)					
Dr. Lijun Ni, Fall 2016, Visiting Assistant Professor	17%	ETAP 652C	PhD, Georgia Institute of Technology	Human-Centered Computing	Computing Education Research

Section 5. Financial Resources and Instructional Facilities

a) What is the resource plan for ensuring the success of the proposed program over time? Summarize the instructional facilities and equipment committed to ensure the success of the program. Please explain new and/or reallocated resources over the first five years for operations, including faculty and other personnel, the library, equipment, laboratories, and supplies. Also include resources for capital projects and other expenses.

This new program will be using existing resources.

b) Complete the five-year SUNY Program Expenses Table, below, consistent with the resource plan summary. Enter the anticipated academic years in the top row of this table. List all resources that will be engaged specifically as a result of the proposed program (e.g., a new faculty position or additional library resources). If they represent a continuing cost, new resources for a given year should be included in the subsequent year(s), with adjustments for inflation or negotiated compensation. Include explanatory notes as needed.

SUNY Program Expenses Table

(OPTION: You can paste an Excel version of this schedule AFTER this sentence, and delete the table below.)

Program Expense Categories	Expenses (in dollars)					
	Before Start	**Academic Year 1:**	**Academic Year 2:**	**Academic Year 3:**	**Academic Year 4:**	**Academic Year 5:**
(a) Personnel (including faculty and all others)						
(b) Library						
(c) Equipment						
(d) Laboratories						
(e) Supplies						
(f) Capital Expenses						
(g) Other (Specify):						
(h) Sum of Rows Above						

Section 6. Library Resources

NOTE: *This section does not apply to certificate or advanced certificate programs.*

Section 7. External Evaluation

NOTE: *This section does not apply to certificate or advanced certificate programs.*

Section 8. Institutional Response to External Evaluator Reports

NOTE: *This section does not apply to certificate or advanced certificate programs.*

Section 9. SUNY Undergraduate Transfer

NOTE: *This section does not apply to certificate or advanced certificate programs.*

Section 10. Application for Distance Education

a) Does the program's design enable students to complete 50% or more of the course requirements through distance education? [ ] No [X] Yes. If yes, **append** a completed *SUNY Distance Education Format Proposal* at the end of this proposal to apply for the program to be registered for the distance education format.

b) Does the program's design enable students to complete 100% of the course requirements through distance education? [ ] No [X] Yes

Section MPA-1. Need for Master Plan Amendment and/or Degree Authorization

NOTE: *This section does not apply to certificate or advanced certificate programs.*

List of Appended Items

Appended Items: Materials required in selected items in Sections 1 through 5 and Section 10 of this form should be appended after this page, with continued pagination. In the first column of the chart below, please number the appended items, and append them in number order.

Number	Appended Items	Reference Items
	For multi-institution programs, a letter of approval from partner institution(s)	Section 1, Item (e)
	For programs leading to professional licensure, a side-by-side chart showing how the program's components meet the requirements of specialized accreditation, Commissioner's Regulations for the profession, or other external standards	Section 2.3, Item (e)
	For programs leading to licensure in selected professions for which the SED Office of the Professions (OP) requires a specialized form, if required by OP	Section 2.3, Item (e)
	OPTIONAL: For programs leading directly to employment, letters of support from employers, if available	Section 2, Item 2.3 (h)(2)
1	For all programs, a plan or curriculum map showing the courses in which the program's educational and (if appropriate) career objectives will be taught and assessed	Section 2, Item 7
2	For all programs, a catalog description for each existing course that is part of the proposed program	Section 3, Item (b)
3	For all programs, syllabi for all new courses in the proposed program	Section 3, Item (c)
	For programs requiring external instruction, *External Instruction Form* and documentation required on that form	Section 3, Item (d)
	For programs that will depend on new faculty, position descriptions or announcements for faculty to-be-hired	Section 4, Item (b)
4	For programs designed to enable students to complete at least 50% of the course requirements at a distance, a *Distance Education Format Proposal*	Section 10

Curriculum Map

The program includes five courses (15 credits), with three required courses (9 credits) and two electives from four concentrations.

The ETAP 652C Teaching Computing in the Secondary School course serves as an introductory course for this program, which provides an overview of current research, theory and practice in K-12 computing education. The course modules include field orientation (the field of computer science, computational thinking and the current state of K-12 computing education), outreach, recruitment and retention in computing, computing curriculum and standards, engaging students in computing- CS teaching methods and programming tools, assessment of learning in computing, integrating computing into traditional subjects, and teacher professional development and communities. Course Knowledge and skills introduced in this course will be further extended by subsequent courses in the program.

ETAP 540 Learning and Teaching Computer Science Principles course serves as a computer science foundation course. It develops computational thinking and practices of algorithm development, problem solving and programming within the context of problems that are relevant to the lives of today's students. This course will extend related topics in the ETAP 652C course (e.g., computational thinking and introductory programming tools, teaching methods, etc). ETAP 540 will also prepare teachers for the forthcoming AP CS Principles course. The INF 596 Special Topics in Informatics (3) enhances students' technical knowledge and skills in computing. The ETAP 526 Educational Computing course provides overview of computing in education. This course also extends technical topics of computer science while focusing on the application of computing in education.

The ETAP 650 Educational Computing in the Math/Science course extends students' knowledge and skills in integrating computational thinking into the context of mathematics or science courses. The two game-focused electives (ETAP 534 and ETAP 535) introduce educators to theory, research, and practice in creating games and teaching computational thinking in the context of educational game. These courses will also empower them for using games to enhance learning broadly.

The two electives of instructional technology-focus (ETAP 628 Instructional Design for Technology and ETAP 639 K-12 Online Teaching and Learning) further extend students' knowledge and skills in teaching computing courses or integrating computational thinking by providing principles of instructional design and online teaching.

Course Descriptions

ETAP 652C Teaching Computing in the Secondary School (3)
Focus is on current research, theory, and practice related to teaching computer science and information technology in pre-college settings. Designed for beginning and advanced classroom teachers, the course promotes inquiry into major contemporary issues concerning computing education; developmental needs, standards and assessments, methods for promoting computational thinking and computational practices across contexts and content areas. This course is part of a sequence that prepares teachers to offer the Advanced Placement Computer Science Principles course and other computing courses.

ETAP 540 Learning and Teaching Computer Science Principles (3)
This course will help students develop updated understandings of computer science principles as well as effective strategies for teaching the computer science principles in K-12 classrooms. The course is designed around the AP Computer Science Principles Curriculum Framework. This curriculum framework outlines seven central concepts of computer science (creativity, abstraction, data and information algorithms, programming, the Internet, global impact) and six computational thinking practices (connecting computing, creating computational artifacts, abstracting, analyzing problems and artifacts, communicating and collaborating). This course will organize these central topics around three big themes: data & information, programming and the Internet with a fourth module debriefing the pedagogy introduced throughout the course.

ETAP 650 Educational Computing in the Math/Science Class (3)
Extended skills in the use of computing for the teaching and learning of mathematics or science. For the mathematics or science teacher seeking to learn strategies for the integration of computers and other IT into educational practice. Individual projects and laboratory experiences.

ETAP 534 Introduction to Games for Learning: Theory and Practice (3)
Introduction to Games for Learning: Theory and Practice will introduce educators to theory, research, and practice in the use of games for learning. Well-designed games can change the way learning occurs, making it both more engaging and effective. Not all games are well designed, and this course will review principles of good game design and good learning. We will also look at research supporting the utility of games as well as examples of how to design games for learning. Students will select, play, and review educational games. Along the way, the course will help students understand the very real potential of games, simulations, and immersive environments to transform education.

ETAP 535 Introduction to Game Design for Educators
In Introduction to Game Design for Educators, students will utilize game programming software in order to create a unique educational game that can be used within the classroom. Students will learn about best practices for game design from renowned game designers. Students will also read educational research pertaining to benefits of using games in the classroom, computational thinking, and empowering students through game design. The goals of this course are to prepare in-service teachers and other educators to teach game design in their own classrooms. This is a fully asynchronous, online, collaborative course.

ETAP 526 Educational Computing (3)
Overview of computing in education; introduction to computer software, application packages, programming, hypermedia, and telecommunications. This course focuses on the application of computing in education, introduction to computer software packages, computer-based learning environments, hypermedia, computer scaffolding and collaboration tools, and telecommunications.

INF 596 Special Topics in Informatics/CS (3)

The content of this course will vary from semester to semester. Each offering will cover an advanced topic in Informatics/Computer Science. Introductory programming in Python/Java will be one topic for students in the CCE certificate program. Gaming reality will be another topic.

ETAP 628 Instructional Design for Technology
Principles of instructional design for use with the microcomputer and other electronic media. No technical background required. Focus on concepts in instructional design and practical application to instructional technology.

ETAP 639 K-12 Online Teaching and Learning
This course is an introduction to K-12 online teaching and learning. This course targets current theory and pedagogy for teaching K-12 students. Throughout the course, you will complete several tasks. You will read literature pertinent to K-12 online teaching and learning. You will discuss challenges online teachers and students face, teaching and learning techniques, and best practices for online course development. Additionally, you will learn about and use technologies used to successfully teach in online environments. You will have small projects throughout the course covering different forms of online learning in the K-12 setting.