MEMORANDUM

TO: Sean Rafferty, Senate Chair

FROM: Havidán Rodríguez, President

DATE: February 25th, 2021

SUBJECT: Senate Bill Approval

I am pleased to approve the following Senate Bill, which was recommended following approval by the University Senate at its meeting of February 24th, 2021.

Senate Bill 2021-05:

PROPOSAL TO ESTABLISH AN ADVANCED CERTIFICATE IN MACHINE LEARNING

Approved: _____

Havidán Rodríguez, President

UNIVERSITY SENATE

UNIVERSITY AT ALBANY

STATE UNIVERSITY OF NEW YORK

Introduced by: Graduate Academic Council

University Policy and Planning Council

Date: February 22, 2021

Proposal to Establish a New Advanced Certificate in Machine Learning.

IT IS HEREBY PROPOSED THAT THE FOLLOWING BE ADOPTED:

1. That the University Senate approves the attached Program proposal as submitted by the College of Engineering and Applied Sciences, to the Graduate Academic Council and the Undergraduate Policy and Planning Council

2. That this takes effect for the Fall 2021 semester.

3. That this proposal be forwarded to President Havidán Rodríguez for approval.

College of Arts and Sciences **Course and Program Action Form** **Proposal No.** _____ 19-097 _____

Please check one: [ ] Course Proposal [X] Program Proposal

Please mark all that apply:

[ ] New Course		Revision of: [ ] Number	[ ] Description
[ ] Cross-Listing		[ ] Title	[ ] Prerequisites
[ ] Shared-Resources Course		[ ] Credits	
[ ] Deactivate/Activate Course (boldface & underline as appropriate)		[X] Other (specify):	New Online Graduate Certificate Program

Department: ____Mathematics and Statistics____   Effective Semester, Year: _Summer 2020_

Course Number   Current: _____ New: _____ Credits: _9_

Course Title: ___Online Graduate Certificate Program "Machine Learning"___

Course Description to appear in Bulletin:

The Certificate in Machine Learning offers a combination of theoretical foundations and a variety of applications that bring participants to the forefront of this fundamental area of modern Data Science. Participants will be taught necessary theoretical mathematical background including basic concepts of Functional analysis typically used in applications, nonlinear programming and optimization methods, and the most up-to-date concepts of Machine Learning. Along with theoretical material students acquire knowledge of contemporary Machine learning software and practical skills of working with this software. Numerous examples coming from real life problems are included. The program is designed with courses that, when taken in sequence, allow a participant with no degree in advanced mathematics develop enough background knowledge and skills to gain graduate level expertise in Machine Learning. The Certificate is offered completely online. It consists of 3 courses:

AMAT 590 Function Theory and Functional Analysis for Applications (3 credits)
AMAT 591 Optimization Methods and Nonlinear Programming (3 credits)
AMAT 592 Machine Learning (3 credits)

Prerequisites statement to be appended to description in Bulletin:

A standard sequence of three calculus courses, including multivariable calculus (AMAT 112, 113, 214 at UAlbany), an undergraduate course in linear algebra (such as AMAT 220), and a course in statistics (such as AMAT 108).

If S/U is to be designated as the only grading system in the course, check here: [ ]

This course is (will be) cross listed with (i.e., CAS ###): _____

This course is (will be) a shared-resources course with (i.e., CAS ###): _____

Explanation of proposal:
(Undergraduate Course/Program proposals: please address the effect on the department's General Education competency plan)

Online Graduate Certificate Program "Machine Learning" is directed to both current graduate students and working professional willing to enhance their skills in this contemporary area of Data Science. It is focused on fundamental mathematical principles of contemporary Machine Learning. Students will be taught necessary theoretical mathematical background including basic concepts of Functional analysis typically used in applications, nonlinear programming and optimization methods, and the most up-to-date concepts of Machine Learning. Along with theoretical material students acquire knowledge of contemporary Machine learning software and practical skills of working with this software. Numerous examples coming from real life problems are included.

Other departments or schools which offer similar or related courses and which have certified that this proposal does not overlap their offering:

This is the first completely online program in Machine Learning at Albany.

If this proposal is for an interdisciplinary program, please indicate the Department where the major/minor will be housed:

Chair of Proposing Department **(TYPE NAME)**	Administrative Manager or Department Secretary **(TYPE NAME)**	Date
Michael Stessin	Joan Mainwaring	09/30/19

Approved by Chair(s) of Departments having cross-listed course(s) **[Copy of e-mail approval(s) on following page.]**	Date	Dean of College	Date
		Caren Stark	2/18/20

Chair of Academic Programs Committee	Date	Dean of Undergraduate or Graduate Studies	Date
Alejandra Bronfman	11/6/19		

Form: CAS Course and Program Action Form (revised 10/19/16)

New Program Proposal:
Certificate or Advanced Certificate Program
Form 2C
Version 2016-10-13

This form should be used to seek SUNY's approval and New York State Education Department's (SED) registration of a proposed new academic program leading to a certificate or an advanced certificate. 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 5 and 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] If Sections 7 and 8 of this form apply, External Evaluation Reports and a single Institutional Response should also be sent, but in a separate electronic document. Guidance on academic program planning is available here.

Table of Contents
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.

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[1] Use a different form if the proposed new program will lead to a graduate degree or any credit-bearing certificate; 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	
a) Institutional Information	Date of Proposal: 9/27/19
	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 District
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: Machine Learning
	Award(s) (e.g., Certificate.): Advanced Certificate
	Number of Required Credits: Minimum [9] If tracks or options, largest minimum [ ]
	Proposed HEGIS Code: 1703
	Proposed 6-digit CIP 2010 Code: 27.0301
	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) Campus Contact	Name and title: Jonathan Bartow, Vice Dean for Graduate Education Telephone: 518-437-5062 E-mail: jbartow@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: Carol Kim, Ph.D. Provost and Senior Vice President for Academic Affairs Signature and date:
	If the program will be registered jointly[4] with one or more other institutions, provide the following information for each institution:
	Partner institution's name and 6-digit SED Code: Name, title, and signature of partner institution's CEO (or **append** a signed letter indicating approval of this proposal):

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[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 formats, 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:

MS in Data Science, program code 39238.

2.3. Program Description, Purposes and Planning

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

Graduate Certificate in Machine Learning:

This program is designed to provide students with the foundation of Machine Learning. Students will also develop practical working skills in this area.

The program requires 9 credits with an average grade of B or higher.

Requirements for admission: undergraduate degree (which is not necessarily in mathematics) and knowledge of calculus through a semester of multivariable calculus.

Program Description:

Required courses consist of AMAT 590 – Function Theory and Functional Analysis for Applications; AMAT 591 – Optimization Methods and Non-linear Programming; AMAT 592 – Methods of Machine Learning. This material builds a solid foundation for application of Machine Learning methods in practice and research.

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 (2006) 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."*

Graduates of this program will attain the following educational and career objectives:

1) They will understand the fundamental principles and theories of Machine Learning

2) They will have the ability to critically analyze data in practice using major Machine Learning concepts and contemporary software packages.

3) They will display the knowledge and skills sufficient to establish a career in Machine Learning as a mathematical tool for Artificial Intelligence.

Student Learning Outcomes:

Knowledge: through coursework, students will acquire foundational knowledge of the discipline of Machine Learning.

Skills: through coursework, students will learn to manipulate data sets with appropriate software, to ask appropriate questions about the data, and to follow up their initial analyses with further questions and investigations.

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 program addresses Priority #1 of the University Strategic plan: **Invest in academic programs**—both in-person and online—that balance emerging demands of students, employers, and society while cultivating intellectual development, ethical reasoning, and practical skills.

The proposed program fills the current gap in training work force proficient in contemporary methods of both theoretical and applied machine learning when working with big data sets. A number of applications to Artificial Intelligence problems makes the program a valuable source for those interested in mathematical methods of AI. The previous experience of offering individual courses of this program makes us expect that it will be very attractive for international students.

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

The program was designed by the faculty who will be teaching the courses. They worked together to choose the material included in the program.

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.

The program is fully supported by the University at Albany, there is no input from external partners. No specialized forms required.

e) 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?

The numbers in the table below are based on previous enrollments in the courses included in the program when taught in both face-to-face and online formats.

| Year | Anticipated Headcount Enrollment | | | Estimated FTE |
	Full-time	Part-time	Total	
1	0	15	15	
2	0	25	25	
3	0	30	30	

4	0	35	35	
5	0	40	40	

f) 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.

Course Title	Credits
AMAT 590 Function Theory and Functional Analysis for Applications (prerequisites: Basic Linear Algebra AMAT 220 or equivalent, Calculus of Several Variables , AMAT 214 or equivalent)	3
AMAT 591 Optimization Methods and Nonlinear Programming (prerequisite: AMAT 590)	3
AMAT 592 Machine Learning (prerequisites: AMAT 591 and AMAT 554 or instructor's permission)	3
Total required credits: 9	

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?

There are no similar programs either in New York State or nationally. We are providing a unique training program here. It gives training in new Machine Learning techniques in data science with deep coverage of the underlying mathematical concepts and methods. Managers of local companies expressed the desire to retrain their workforce in these powerful methods of data analysis. It will allow certificate holders to find positions in the actuarial field, the insurance industry, financial institutions, state government, biomedical research, etc.

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.

	Need: Projected positions	
Employer	**In initial year**	**In fifth year**

The program is not designed with specific employers in mind. It is rather directed to the growing needs of academia and industry in work force trained to deal with big data sets using the most contemporary mathematical tools.

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

None			

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

No.

h)(5) *Concerns or Objections:* If concerns and/or objections were raised by other SUNY campuses, how were they resolved? Not applicable.

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.

> Students are admitted with various undergraduate majors in mathematics, science and social sciences. In addition to the general University requirements for admission to graduate studies, students who are deficient in their mathematical preparation must make up such deficiencies before being formally admitted into the program.

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

> Review by the Graduate Committee of our department, which is composed of full-time faculty.

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

> We will advertise in multiple ways, including posters, advertisements and recruiting talks. We also use the same advertisement tools we currently use for our Master's program in Data Science to attract students from mathematics science departments at Historically Black Colleges and Universities.

2.5. Academic and Other Support Services

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

Two faculty members who will teach online courses for this program will provide advisement to the students enrolled in the program.

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 assessment will be performed along with the assessments of the other graduate programs in the Department of Mathematics and Statistics. We will also track the employment records of those students graduated from the program who will be seeking an employment, and records of promotion of those currently employed and working on the obtaining of his certificate to enhance their skills. Consistent with University policy, our Department maintains a 7-year assessment cycle for its programs. The Department will apply the same methodology to the assessment of the Graduate Certificate Program in Machine Learning that it performs in the assessment of all its programs. This will include direct assessment through student work in the courses, indirect assessment through student surveys, and indirect assessment through student focus groups. The assessment methods will identify successes and deficiencies in the program, and we will use assessment results to address deficiencies and build and maintain program strength and make sure that learning objectives are met.

Section 3. 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 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: 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 in Regulation 52.2 http://www.highered.nysed.gov/ocue/lrp/rules.htm.*

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.*

The program will be offered during summer and winter sessions. There will be no impact on financial aid eligibility.

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.

See **Appendix 1.**

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

No new courses.

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.

N/A

SUNY Program Schedule for Certificate and Advanced Certificate Programs

Program/Track Title and Award:___Graduate Certificate Program in Machine Learning_____

- Indicate **academic calendar type**: [ ] Semester   [ ] Quarter   [ ] Trimester   [X] Other (describe): online during Summer and Winter sessions
- **Label each term in sequence**, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2)
- 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.**

Summer 1:				Winter 1:			
Course Number & Title	Credits	New (X)	Co/Prerequisites	Course Number & Title	Credits	New (x)	Co/Prerequisites
AMAT 590 Function Theory and Functional Analysis for Applications	3		Basic linear algebra, calculus	AMAT 592 Methods of Machine Learning	3		AMAT 591
AMAT 591 Optimization methods and Nonlinear Programming	3		AMAT 590				
Term credit totals:				Term credit totals:			
Term 3:				**Term 4:**			
Course Number & Title	Credits	New (X)	Co/Prerequisites	Course Number & Title	Credits	New (X)	Co/Prerequisites
Term credit totals:				Term credit totals:			

Program Totals (in credits):	Total Credits: 9

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 http://www.highered.nysed.gov/ocue/lrp/rules.htm.

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

All faculty in this program are full-time tenured faculty who, in addition to maintaining an active research program and advising doctoral students, teach 2 courses each 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) Faculty Member Name and Title/Rank (Include and identify Program Director with an asterisk)	(b) % of Time Dedicated to This Program	(c) Program Courses Which May Be Taught (Number and Title)	(d) Highest and Other Applicable Earned Degrees (include College or University)	(e) Discipline(s) of Highest and Other Applicable Earned Degrees	(f) Additional Qualifications: List related certifications, licenses and professional experience in field
PART 1. Full-Time Faculty					
*Stessin, Prof.	10%	AMAT 590, Function theory and Functional analysis for applications	PH.D. Moscow State University	Mathematics	
Ying, Assoc. Prof.	20%	AMAT 591, Optimization methods and nonlinear programming, AMAT 592, Machine Learning	Ph.D. Zhejiang University	Mathematics	
Part 2. Part-Time Faculty					

(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)					

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.

Presently we have enough faculty to teach these classes. Additional faculty will require when the enrollment exceed the size of two sections. We anticipate that these additional faculty will be required the third year and on since the initialization of the program.

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)**		9,500	14,000	18,500	18,500	18,500
(b) Library						
(c) Equipment						
(d) Laboratories						
(e) Supplies						
(f) Capital Expenses						
(g) Other (Specify):						
(h) Sum of Rows Above		9500	14000	18500	18500	18500

- **Adjunct faculty will not be involved with this program.**

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.

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)
	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)
3	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

Appendix 1. Chart linking learning objectives to the specific courses

Objective number	Course
1) Graduates will understand the fundamental principles and theories of Machine Learning	AMAT 590, AMAT 591, AMAT 592
2) Graduates will have the ability to critically analyze data in practice using major Machine Learning	AMAT 592

concepts and contemporary software packages	
3) Graduates will display the knowledge and skills sufficient to establish a career in Machine Learning as a mathematical tool for Artificial Intelligence	AMAT 592

Appendix 2:

Catalog description for each existing course that is part of the proposed program.

Mat 590 Function Theory and Functional Analysis for Applications (3)

This course covers function analytic aspects necessary for applications in various areas of science and engineering, notably in Data Science. Among main topics of the course are: elementary theory of Lebesgue measure and integration, spaces of Lebesgue integrable functions, Banach spaces and Hanh-Banach theorem, duality in Banach spaces, Hilbert spaces, reproducing kernel Hilbert spaces, non-linear analysis in Banach spaces. Prerequisites: Basic linear algebra, e.g., AMAT 220; calculus of several variables, e.g., AMAT 214

Mat 591 Optimization Methods and Nonlinear Programming (3)

Modern methods in convex optimization and nonlinear programming. Newton's method, gradient descent, linear programming, quadratic optimization, semidefinite programming and related topics. Prerequisites: AMAT590.

Mat 592 Machine Learning (3)

The primary goal of this course is to provide students with statistical tools and mathematical principles needed to solve both the traditional and modern data science problems encountered in practice. In particular, the course covers a wide variety of topics in machine learning. It introduces the key terms, concepts and methods in machine learning, with an emphasis on developing critical analytical skills through hands-on exercises of actual data analysis tasks. At the same time, it will cover modern machine learning topics such as boosting and online learning for large-scale data analysis. In addition, the students will practice basic programming skills to use software tools in machine learning. Prerequisites: AMAT591 and AMAT 554.

When a new or existing program is designed for a distance education format, a campus Chief Executive Officer or Chief Academic Officer should submit a signed cover letter and this completed form to the SUNY Provost at *program.review@suny.edu*. According to MSCHE, the 50% standard includes only courses offered in their entirety via distance education, not courses utilizing mixed delivery methods. Also, MSCHE requires that the first two programs for which 50% or more is offered through distance education be submitted for Commission review and prior approval of a substantive change.

- All campuses must complete the following sections: Sections 1 - 3, and Part B: Program Specific Issues.

- Part A must be completed if the proposing campus has not previously submitted this form with a completed Part A: Institution-wide Issues, or has made significant changes to its institution-wide distance education operations since last completing Part A. This applies even if the institution has programs registered to be delivered at a distance.

Section 1. General Information		
a) **Institutional Information**	Institution's 6-digit SED Code:	**210500**
	Institution's Name:	University at Albany
	Address:	1400 Washington Ave, Albany NY 12222
b) **Registered or Proposed Program**	Program Title:	Machine Learning
	SED Program Code	
	Award(s) (e.g., A.A., B.S.):	Advanced Certificate
	Number of Required Credits:	Minimum [9] If tracks or options, largest minimum [ ]
	HEGIS Code:	1703
	CIP 2010 Code:	27.0301
c) **Distance Education Contact**	Name and title: Jonathan Bartow, Vice Dean for Graduate Education	
	Telephone: 518-437-5062 E-mail: jbartow@albany.edu	
d) **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: Carol Kim, Ph.D. Provost and Senior Vice President for Academic Affairs Signature and date:	
	If the program will be registered jointly[5] with one or more other institutions, provide the following information for each institution:	
	Partner institution's name and 6-digit SED Code: Name, title, and signature of partner institution's CEO (or **append** a signed letter indicating approval of this proposal):	

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[5] If the partner institution is non-degree-granting, see SED's CEO Memo 94-04.

Section 2: Enrollment

Year	Anticipated Headcount Enrollment			Estimated FTE
	Full-time	Part-time	Total	
1	10	5	15	
2	15	10	25	
3	20	10	30	
4	25	10	35	
5	30	10	40	

Section 3: Program Information

a) **Term length** (in weeks) for the distance program: 4 weeks

b) Is this the same as term length for classroom program? [X] No   [   ] Yes

c) How much "**instructional time**" is required per week per credit for a distance course in this program? (Do not include time spent on activities that would be done outside "class time," such as research, writing assignments, or chat rooms.)   **NOTE:** See SUNY policy on credit/contact hours and SED guidance.

   15 hours per week

d) What proportion or percentage of the program will be offered in Distance Education format? Will students be able to complete 100 percent of the program online? If not, what proportion will be able to be completed online?

   100%

e) What is the maximum number of students who would be enrolled in an online course section?

   15 students per section. Multiple sections are possible.

Part A: Institution-wide Issues: Submit Part A only for the **first** Distance Education program proposed by your institution using this form. SUNY and the State Education Department will keep this in a master file so that your institution will not need to resubmit it for each new proposed online program, **unless there are significant changes, such as a new platform**.

Part A.1. Organizational Commitment

a) Describe your institution's planning process for Distance Education, including how the need for distance access was identified, the nature and size of the intended audiences, and the provisions for serving those audiences, including how each student's identity will be verified.

b) Describe your institution's resources for distance learning programs and its student and technical support services to ensure their effectiveness. What course management system does your institution use?

c) Describe how the institution trains faculty and supports them in developing and teaching online courses, including the pedagogical and communication strategies to function effectively. Describe the qualifications of those who train and/or assist faculty, or are otherwise responsible for online education.

d) If your institution uses courses or academic support services from **another provider**, describe the process used (with faculty participation) to evaluate their quality, academic rigor, and suitability for the award of college credit and a degree or certificate.

e) Does your institution have a clear ***policy on ownership of course materials*** developed for its distance education courses? How is this policy shared with faculty and staff? ***NOTE:*** *You may refer to [SUNY's statement on copyright and faculty ownership of instructional content](#), and/or faculty contract provisions.*

Part A.2. Learner Support

a) Describe how your institution provides distance students with ***clear information*** on:
- Program completion requirements

> *To successfully complete the program a student must pass all three courses with grades not below than B- and have total GPA 3.0 or above.*

- The nature of the learning experience

> *Students will take online lectures, do homework assignments, and pass exams.*

- Any specific student background, knowledge, or technical skills needed

> *Calculus courses AMAT 112, AMAT 214 and an undergraduate Linear Algebra (AMA 220).*

- Expectations of student participation and learning

> *Students are supposed to study the Lectures material provided for them, participate in bulletin board discussions, and perform in time the required classwork.*

- The nature of interactions among faculty and students in the courses.

> *Students are supposed to communicate with the instructor via bulletin board discussions and via e-mail messages.*

- Any technical equipment or software required or recommended.

> *No special equipment is required.*

b) Describe how your institution provides distance learners with adequate ***academic and administrative support***, including academic advisement, technical support, library and information services, and other student support services normally available on campus. Do program materials clearly define how students can access these support services?

SUNY Albany supports Blackboard platform for the program and provides technical consultations for courses development.

c) Describe how ***administrative processes*** such as admissions and registration are made available to distance students, and how program materials inform students how to access these services.

The admission and registration for the program courses is maintained by the Office of Summer Sessions. All appropriate material is available through the University web page.

d) What ***orientation*** opportunities and resources are available for students of distance learning?

For each course of the program the instructor prepares and posts on board course description and detailed information on course requirements, procedures, and schedules.

Part B: Program-Specific Issues: Submit Part B for <u>each new request</u> to add Distance Education Format to a proposed or registered program.

Part B.1. Learning Design

a) How does your institution ensure that the ***same academic standards and requirements*** are applied to the program on campus and through distance learning? If the curriculum in the Distance Education program differs from that of the on-ground program, please identify the differences.

The curriculum of each course of this program is identical to the one offered in the face-to-face format and typically is taught by the same faculty. The same academic standards are assumed for the online program.

b) Are the courses that make up the distance learning program offered in a sequence or configuration that allows ***timely completion of requirements***?

Each course of the program is planned to be offered every Summer and Winter session which allows student necessary flexibility to complete the program in a timely manner.

c) How do faculty and others ensure that ***the technological tools*** used in the program are appropriate for the content and intended learning outcomes?

The courses of the program are supported by the Blackboard platform, which proved to be an effective and reliable venue for this kind of classes.

d) How does the program provide for appropriate and flexible interaction between faculty and students, and among students?

Bulletin board is proven to be a successful way of communication in addition to regular e-mail correspondence.

e) How do faculty teaching online courses verify that the student who registers in a distance education course or program is the same student who participates in and completes the course or program and receives the academic credit?

The University at Albany utilizes two layers of authorization and authentication for students who participate in online learning. Students are required to establish an account and to log in to the University password protected domain using the NETID protocol and must also log into the Blackboard Learning Management System using their university credentials. Blackboard also uses Safe Assign as a tool to monitor the completion of certain tasks within the LMS environment.

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Part B.2. Outcomes and Assessment

a) Distance learning programs are expected to produce the ***same learning outcomes*** as comparable classroom-based programs. How are these learning outcomes identified – in terms of knowledge, skills, or credentials – in course and program materials?

The online courses are routinely offered on campus. They follow the same syllabi outlining necessary of knowledge, skills, or credentials in course and program materials

b) Describe how the ***means chosen for assessing student learning*** in this program are appropriate to the content, learning design, technologies, and characteristics of the learners.

Assessing student learning in the program will be equivalent to assessing the student in a face-to-face environment. Neither our classroom versions nor our online courses rely on high-stakes exams that are incompatible with the asynchronous online pedagogy employed in the program. All course activities can be successfully completed and assessed online. In general learners are required to demonstrate developing understanding through a variety of assessments that include written work in various forms with formative and summative feedback provided by the instructor.

Part B.3. Program Evaluation

a) What process is in place to monitor and ***evaluate the effectiveness*** of this particular distance education program on a regular basis?

The Department of Mathematics and Statistics has a yearly evaluation process, including course surveys, graduation surveys and monitoring of course grades. This program will use the same evaluation system as the other accredited degrees.

b) How will the evaluation results will be used for ***continuous program improvement***?

The Graduate Director routinely reviews evaluation results and arranges for mentoring and other supports where needed to improve instruction. The department faculty members routinely discuss the courses and programs drawing on evaluation results, to discuss any needed improvements.

c) How will the evaluation process assure that the ***program results in learning outcomes appropriate to the rigor and breadth*** of the college degree or certificate awarded?

The program evaluation is the same for students taking online or campus based courses. Most of these courses are already part of programs with national accreditation. Therefore they meet university requirements for rigor and breadth required of graduate coursework, including credits, format, and assignments needed for a graduate degree.

Part B.4. Students Residing Outside New York State

SUNY programs must comply with all "authorization to operate" regulations that are in place in other U.S. states where the institution has enrolled students or is otherwise active, based on each state's definitions.

a) What processes are in place to monitor the U.S. state of residency of students enrolled in any distance education course in this program while residing in their home state?

Distance learning students will be flagged in our integrated administrative system. This will allow regular querying so that we can identify any our of state students who participate from their home state. We can then seek approval from their home state if necessary.

b) Federal regulations require institutions delivering courses by distance education to provide students or prospective students with contact information for filing complaints with the state approval or licensing entity in the student's

state of residency and any other relevant state official or agency that would appropriately handle a student's complaint. What is the URL on your institution's website where contact information for filing complaints for students in this program is posted?   ***NOTE:*** *Links to information for other states can be found at [here](.).*

www.albany.edu/ir/rtk/

NOTE: Links to information for other states can be found at **http://system.suny.edu/academic- affairs/distance-learning/**