KINGSBOROUGH COMMUNITY COLLEGE
The City University of New York

CURRICULUM TRANSMITTAL COVER PAGE

Department:__Mathematics & Computer Science_____ Date: __March 15, 2017_____

Title Of Course Or Degree:_Dual Admission Joint B.S. degrees in Computer Science and Information Security with John Jay College._____

Change(s) Initiated: (Please check)

☐ Closing of Degree
☐ Closing of Certificate
☐ New Certificate Proposal
☐ New Degree Proposal
☐ New Course
☐ New 82 Course
☐ Deletion of Course

☐ Change in Degree or Certificate Requirements
☐ Change in Degree Requirements (adding concentration)
☐ Change in Pre/Co-Requisite
☐ Change in Course Designation
☐ Change in Course Description
☐ Change in Course Title, Numbers Credit and/or Hour
☐ Change in Academic Policy
☐ Pathways Submission:
　☐ Life and Physical Science
　☐ Math and Quantitative Reasoning
　☐ A. World Cultures and Global Issues
　☐ B. U.S. Experience in its Diversity
　☐ C. Creative Expression
　☐ D. Individual and Society
　☐ E. Scientific World

☑ Other (please describe):_Dual degree program creation: joint program with John Jay College, B.S. degree in Computer Science & Information Security._____

PLEASE ATTACH MATERIAL TO ILLUSTRATE AND EXPLAIN ALL CHANGES

DEPARTMENTAL ACTION

Action by Department and/or Departmental Committee, if required:

Date Approved:_03/15/2017__ Signature, Committee Chairperson:_____

I have reviewed the attached material/proposal

Signature, Department Chairperson: _____

Change or Adapt a Registered Program

Use the Request to Change or Adapt a Registered Program form to request program changes that require approval by the State Education Department (see chart).* For **programs that are registered jointly** with another institution, all participating institutions must confirm support for the changes.

Exceptions:
- To change a registered professional licensure program or add a license qualification to an existing program, contact the Office of the Professions for guidance.
- To change a registered teacher certification or educational leadership certification program or add a certificate qualification to an existing program, use the education program change form.

Changes and Adaptations Requiring State Education Department Approval

Changes in Program Content (all programs)
 	
1. *Any* of the following substantive changes:
 	
    ■ Cumulative change from the Department's last approval of the registered program of one-third or more of the minimum credits required for the award (e.g., 20 credits in an associate degree program)
    ■ Changes in the program's focus or design (e.g., eliminating management courses in a business administration program), including a change in the program's major disciplinary area
    ■ Adding or eliminating an option or concentration
    ■ Eliminating a requirement for completion, including an internship, clinical, cooperative education, or other work-based experience
    ■ Altering the liberal arts and science content in a way that changes the degree classification, as defined in Section 3.47(c)(1-4) of Regents Rules

Other Changes (all programs) 2. Program title 3. Program award (e.g., change in degree) 4. Mode of delivery (**Note**: if the change involves adding a **distance education format** to a registered program, please complete the distance education application.) 5. Discontinuing a program 6. A format change that alters the program's financial aid eligibility (e.g., from full-time to part-time, or to an abbreviated or accelerated semester) 7. A change in the total number of credits of any certificate or advanced certificate program
Establishing New Programs Based on Existing Registered Programs 8. Creating a dual-degree program from existing registered programs 9. Creating a new program from a concentration/track in an existing registered program

PLEASE NOTE:

Establishing an existing program at a new location requires new registration of the program. If the requested action changes the program's major disciplinary area, master plan amendment may be needed if the revised program represents the institution's first program in that major subject area, at that degree level. If a requested **degree title** is not authorized for an institution chartered by the Board of Regents, charter amendment will be needed.

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* **CUNY and SUNY** institutions: contact System Administration for guidance.

NEW YORK STATE EDUCATION DEPARTMENT
Office of Higher Education—Office of College and University Evaluation
89 Washington Avenue, Albany, NY 12234
(518) 474-2593 Fax: (518) 486-2779
ocueinfo@mail.nysed.gov
http://www.highered.nysed.gov/ocue/

Request to Change or Adapt a Registered Program

Item	Response (type in the requested information)
Institution name and address	City University of New York, Kingsborough Community College 2001 Oriental Boulevard, Brooklyn, NY 11235 *Additional information*: ▪ Specify campus where program is offered, if other than the main campus:
Identify the program you wish to change	Program title: Computer Science Award (e.g., B.A., M.S.): A.S., Computer Science Credits: 60 HEGIS code: 5103.00 Program code: 01040
Contact person for this proposal	Name and title: Rina Yarmish, Chairperson Telephone: (718) 368 - 5931 Fax: (718) 368 - 4868 E-mail: RYarmish@kbcc.cuny.edu
CEO (or designee) approval *Signature affirms the institution's commitment to support the program as revised.*	Name and title: Signature and date:
	If the program will be registered jointly[1] with another institution, provide the following information:
	Partner institution's name: Name and title of partner institution's CEO: Signature of partner institution's CEO:

- For **programs that are registered jointly** with another institution, all participating institutions must confirm their support of the changes.
- To change a registered professional licensure program or add a license qualification to an existing program, contact the Office of the Professions for guidance.
- To change a registered teacher certification or educational leadership certification program or add a certificate qualification to an existing program, use the education program change form.
- If the change involves **establishing an existing registered program at a new location**, complete a new registration application for the proposed program.

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[1] If the partner institution is non-degree-granting, see CEO Memo 94-04 at www.highered.nysed.gov/ocue/ceo94-04.htm.

Changes in Program Content *(Describe and explain all proposed changes; provide a side-by-side comparison of the existing and newly modified programs.)*

[ ]   Cumulative change from the Department's last approval of the registered program that impacts one-third or more of the minimum credits required for the award (e.g., 20 credits in an associate degree program)

[ ]   Changes in a program's focus or design

[ ]   Adding or eliminating an option or concentration

[ ]   Eliminating a requirement for program completion

[ ]   Altering the liberal arts and science content in a way that changes the degree classification, as defined in Section 3.47(c)(1-4) of Regents Rules

If new courses are being added as part of the noted change(s), provide a syllabus for each new course and list the name, qualifications, and relevant experience of faculty teaching the course(s). Syllabi should include a course description and identify course credit, objectives, topics, student outcomes, texts/resources, and the basis for determining grades.

Other Changes *(describe and explain all proposed changes)*

[ ]   **Program title**

[ ]   **Program award**

[ ]   **Mode of** Delivery (**Note**: if the change involves adding a **distance education format** to a registered program, please complete the distance education application.)

[ ]   **Discontinuing a program**: indicate the date by which the program will be discontinued.[2]

[ ]   **Format change** (e.g., from full-time to part-time, or to an abbreviated or accelerated semester)

   a) Indicate proposed format:

   b) Describe availability of courses and any change in faculty, resources, or support services:

   c) Use the Sample Program Schedule to show the sequencing and scheduling of courses in the program.

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[2] If any students do not complete the program by the proposed termination date, the institution must request an extension of the registration period for the program or make other arrangements for those students.

Establishing New Programs Based on Existing Registered Programs

[ ]   **Creating a dual**-degree program from existing registered programs

a) Complete the following table to identify the existing programs:

	Program Title	Degree Award	Program Code
Program 1	Computer Science	A.S.	01040
Program 2	Computer Science and Information Security	B.S.	88202

b) Proposed dual-degree program (title and award):[3]   Dual Admission Joint B.S. degrees in Computer Science and Information Security from the existing John Jay B.S. and Kingsborough A.S Computer Science programs

c) Courses that will be counted toward both awards: CS 1200, CS 13A0, CS 1400, CS 3500, MAT 1500, and MAT 5600; 30 credits in fulfilment of CUNY Pathways requirements

d) Length of time for candidates to complete the proposed program: 4 years

e) Use the Sample Program Schedule to show the sequencing and scheduling of courses in the dual-degree program. See Attachment "A"

[ ]   **Creating a new program from a** concentration/track in an existing program.

If the new program is based *entirely* on existing courses in a registered program, provide the current program name, program code, and the following information:

Note: this abbreviated option applies only if a master plan amendment is NOT required *and* there are no new courses or changes to program admissions and evaluation elements. If these conditions are not met, submit a new registration application for the proposed program.

a) Information from the Application for Registration of a New Program form: cover page (page 1), Sample Program Schedule form, and faculty information charts (full-time faculty, part-time faculty, and faculty to be hired) See Attachment "A"

b) Brief description of the proposed program and rationale for converting the existing coursework to a separately registered program: See Attachment "B"

c) Expected impact on existing program: See Attachment "C"

d) Adjustments the institution will make to its current resource allocations to support the program:. See Attachment "D"

e) Statement confirming that the admission standards and process and evaluation methods are the same as those in the existing registered program: See Attachment "E"

Note: if the change involves **establishing an existing registered program at a new location,** complete a new registration application for the proposed program.
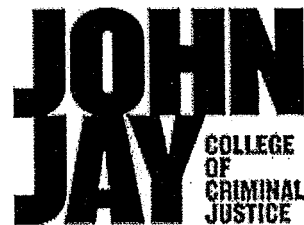
September 2009

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[3] Only candidates with the capacity to complete the requirements of both degrees shall be admitted to a dual-degree program.

KINGSBOROUGH

COMMUNITY COLLEGE

JOHN JAY COLLEGE OF CRIMINAL JUSTICE
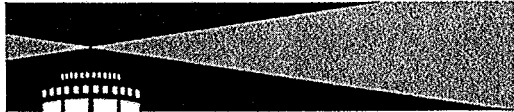
Department of Mathematics and Computer Science

Proposal to create Dual Admission Joint B.S. degrees in Computer Science and Information Security from the existing John Jay B.S. and Kingsborough A.S Computer Science programs.

March 3, 2017

Effective date: Fall 2017 (pending NYSED registration)

Background and Process:

The Department Chair and the Curriculum Committee of the Department of Math and Computer Science have approved this proposal to create a joint degree program by articulating the existing B.S. in Computer Science and Information Security at John Jay with the A.S. in Computer Science at each community college.

Since this joint degree program is being created from existing registered programs, a full degree proposal is not required. However, since all dual admission/joint degrees in New York State are created through governance at both the 2-year and the 4-year institution, John Jay College and each community college will bring this proposal through governance. In addition, the colleges must submit the NYSED "Change or Adapt a Registered Program" form, indicating that they are "Creating a dual-degree program from existing registered programs."

Overview:

Cybersecurity represents an unusually broad, remarkably well-compensated set of new and emerging occupational areas, offering a surfeit of employment opportunities in New York City due to the severe shortage of qualified cyber-workers. These occupations rank among the fastest growing professional employment opportunities in NYC.[1] The NYC Department of Labor estimates overall growth in cyber-allied fields at over 20% by 2020, with higher projections for selected categories (36.5%), and with near astronomical growth rates anticipated (58.6%) for the most highly skilled by 2022.[2] This explosive growth places New York City second nationally—just behind Washington, D.C.—for cybersecurity employment opportunities.[3]

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[1] According to the U.S. Bureau of Labor Statistics, growth in information security jobs is projected at 37% from 2012–2022, a rate two and one-half times faster than the average for all occupations: http://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm.
[2] See http://www.labor.ny.gov/stats/lsproj.shtm for 2012-2022 growth projections and http://burning-glass.com/wp-content/uploads/Cybersecurity_Jobs_Report_2015.pdf for industry-specific cybersecurity employment increases over the last 5 years. Cybersecurity workers earn 2-3 times more than the national average for similarly educated employees.
[3] http://www.washingtonpost.com/news/capital-business/wp/2014/03/05/evidence-that-the-d-c-area-really-is-a-hotbed-for-cybersecurity-jobs/ and http://www.burning-glass.com/research/cybersecurity/; cybersecurity postings have **grown 74%** from 2007-2013 nationally.

The field offers remarkable earning opportunities for successful college graduates. Entry-level positions in the cybersecurity fields are unusually well-paid, with private sector career entrants earning roughly $60,000 to start, a figure that can double within the first two-years of employment. The number of qualified applicants for cybersecurity occupations, however, has lagged severely behind the number of openings, causing a critical gap in the public and private sectors' security defense and severe shortages of cyber-workers in specific industries, including financial services, healthcare and retail trade--among the largest industries in the NYC economy. In addition, private sector New York employers point to the problem of inappropriately prepared applicants who lack rudimentary familiarity with the professional work world. They also underscore the dearth of knowledgeable and skills-qualified career entrants, which causes long-term job vacancies, limits the productivity of newly hired cybersecurity professionals, and stunts economic growth as the incidence and costs of cybercrime mushroom and place at grave financial risk both businesses and the public.

John Jay College and several CUNY Community Colleges propose a dual admission/joint degree program (A.S./B.S.) in Computer Science and Information Security that will help address these shortages and deficiencies. In addition, the planned degree aims to:

1) improve student academic success at the community and senior colleges;
2) increase the rate of transfer from the associate degree to the bachelor's degree;
3) bolster preparation and professional development opportunities for students' career entry and success in the cyber security and tech fields, and
4) ensure curricular alignment between the colleges and the needs of cybersecurity and tech employers.

The aforementioned Community Colleges and John Jay will launch this collaborative program by building on their successful track-record in the CUNY Justice Academy. The CUNY Justice Academy is a unique educational partnership connecting John Jay College of Criminal Justice to CUNY's six traditional community colleges. This program currently provides academic pathways leading from associate degree study to a bachelor's degree and ultimately to exciting careers in the fields of Criminal Justice, Forensic Science and Forensic Financial Analysis. Assessment shows that CUNY Justice Academy programs have led to an unprecedented transfer rate of associate degree students from the participating community colleges to John Jay College when compared to the rate of non-CUNY Justice Academy transfers. The programs of the CUNY Justice Academy have also positively impacted student G.P.A.s, rates of credit accumulation, and time to degree completion. We anticipate that students who enroll in the proposed dual admission/joint degree program Computer Science and Information Security will benefit similarly.

Contributing to students' professional preparation and development, the degree program offers internships and other experiential learning opportunities. The program benefits from a partnership with the Cybersecurity Workforce Alliance (CWA)--an association of private sector employers, technology innovators, and educators, including the Federal Reserve Bank of NY, Fidelity Bank, Bank of NY Mellon, J.P. Morgan Chase, Morgan Stanley, Goldman Sachs, SIFMA, Express Scripts, RANE, iQ4, and Capgemini, among others--formed to increase and improve the cybersecurity workforce. Students at John Jay and the partner community colleges have the opportunity to participate in the Cybersecurity Virtual Internship, developed jointly by John Jay and external workforce partners to simulate cybersecurity threat scenarios, allowing students to develop professional experience,

practice leadership and collaboration, and build résumé, interview, and presentation skills. As they advance in the degree program, students have the opportunity to apply the knowledge they have learned through a professional internship opportunity, and in an extensive capstone experience that provides hands-on laboratory experience over the course of two semesters. The degree program also makes use of new and emerging technologies via the in-house laboratory, the Computer Science, Data & Statistics Resource Center, and the iQ4 Digital Portfolio, to optimally ready students[4] for cybersecurity careers, thereby expanding employment opportunities for the city's lower income college students by providing them with openings to highly paid jobs in the private sector that have been previously unavailable to them.

Assessment:

As a dual joint program formed from existing programs, the proposed dual joint program will be subject to each college's established and ongoing assessment processes for programs, courses, students, and instructors, including academic program review, learning outcomes assessment, and faculty evaluations.

In addition, student performance, persistence, and completion in the joint degree will be tracked and addressed to facilitate continuous improvement by relevant staff at each participating college, including faculty, program coordinators and liaisons, and the CUNY Justice Academy Steering committee.

Participating Degree Programs:

This proposal addresses the joint degree programs between the following colleges:

From	To
Kingsborough Community College A.S. in Computer Science Program Code: 01040	John Jay College B.S. in Computer Science and Information Security Program Code: 88202

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[4] John Jay students are among the poorest of senior college students at CUNY according to the most recent IPEDS' Pell eligibility reporting data. CJA community college students rank in the bottom half of all CUNY college students, with one exception, using the same criterion.

Curriculum:

John Jay B.S. in Computer Science and Information Security 57-60 Cr.

Prerequisites (depending on math placement)   0-3 Cr
MAT 141 Precalculus

Part One. Core Computer Science Courses   33 Cr
Required
CSCI 271 Introduction to Computing and Programming
CSCI 272 Object-Oriented Programming
CSCI 274 Computer Architecture
CSCI 360 Cryptography and Cryptanalysis
CSCI 373 Advanced Data Structures
CSCI 374 Programming Languages
CSCI 375 Operating Systems
CSCI 377 Computer Algorithms
CSCI 379 Computer Networking
CSCI 411 Computer Security and Forensics
CSCI 412 Network Security & Forensics

Part Two. Required Math Courses   9 Cr.
Required
MAT 204 Discrete Structures
MAT 241 Calculus I
MAT 301 Probability and Mathematical Statistics I

Part Three. Electives   6 Cr.
Category A. Computer Science Electives
Select one
CSCI 362 Databases and Data Mining
CSCI 376 Artificial Intelligence
CSCI 380 Selected Topics in Computer Science
CSCI 404 Internship in Management Information Systems
Experiential learning, Professional experience, and networking opportunity.

Category B. Mathematics Electives
Select one
MAT 242 Calculus II
MAT 243 Calculus III
MAT 244 Calculus IV
MAT 310 Linear Algebra
MAT 351 Introduction to Ordinary Differential Equations
MAT 371 Numerical Analysis
MAT 380 Selected Topics in Mathematics

Part Four. Ethics   3 Cr.

Required

PHI 216 Ethics and Information Technology

Part Five. Capstone Courses   6 Cr.

Required

CSCI 400 Capstone Experience in Digital Forensics/Cybersecurity I

This capstone course is designed to provide students with a hands-on experience based on the theoretical knowledge they have acquired by taking other security-oriented courses. The course will accomplish its goals through a number of in-lab programming exercises. Topics covered may include: cryptographic algorithms and protocols; authentication and authorization protocols; access control models; common network (wired and wireless) attacks; typical protection approaches including firewalls and intrusion detection systems; operating systems and application vulnerabilities, exploits, and countermeasures.

CSCI 401 Capstone Experience in Digital Forensics/Cybersecurity II

This course will cover advanced network and host security concepts and mechanisms. In addition to treating subjects in theory, the course includes projects that provide extensive hands-on experience assessing vulnerabilities, writing real working exploits for existing systems in a closed and controlled environment, and developing countermeasures to both perceived and real threats. The class will involve a fair amount of programming. Those who take the class are expected to be able to program in C/C++, have a solid knowledge of assembly and scripting languages, and be familiar with network basics as well as modern operating systems (Windows, MacOS, Unix).

Joint B.S. Degree with Kingsborough Community College   57-60 Cr.

Prerequisites (depending on Math Placement)   0-3 Cr.
MAT 1400 – Analytic Geometry and Pre-Calculus Mathematics (at KBCC, for MAT 141 Precalculus)[1]

Part One. Core Computer Science Courses   33 Cr
Required
CS 1200 Intro to Computing[1] (at KBCC, for CSCI 271 Introduction to Computing and Programming)
CS 1300 Advanced Programming[1] (at KBCC, for CSCI 272 Object-Oriented Programming)
CS 1400 Computer & Assembly Lang Program[1] (at KBCC, for CSCI 274 Computer Architecture)
CSCI 360 Cryptography and Cryptanalysis
CSCI 373 Advanced Data Structures
CSCI 374 Programming Languages
CSCI 375 Operating Systems
CSCI 377 Computer Algorithms
CSCI 379 Computer Networking
CSCI 411 Computer Security and Forensics
CSCI 412 Network Security & Forensics

Part Two. Required Math Courses   9 Cr.
Required
MAT 1500 Calculus I[1] (at KBCC, for MAT 241 Calculus I)
CS 3500 Discrete Structures[1] (at KBCC, for MAT 204 Discrete Structures)
MAT 301 Probability and Mathematical Statistics I

Part Three. Electives   6 Cr.
Category A. Computer Science Electives
Select one
CSCI 362 Databases and Data Mining
CSCI 376 Artificial Intelligence
CSCI 380 Selected Topics in Computer Science
CSCI 404 Internship in Management Information Systems

Category B. Mathematics Electives
MAT 5600 Linear Algebra (at KBCC, for MAT 310 Linear Algebra)

Part Four. Ethics   3 Cr.
Required
PHI 216 Ethics and Information Technology

Part Five. Capstone Courses   6 Cr.
Required
CSCI 400 Capstone Experience in Digital Forensics/Cybersecurity I
CSCI 401 Capstone Experience in Digital Forensics/Cybersecurity II

Also required for KBCC A.S.: HE 1400 Critical Issues in Health (1 cr), MAT 1600 Calculus II, and the following courses[2]:

MAT/BA 2200: Business Statistics or MAT/BIO 9100 Biostatistics
MAT 2100 Calculus III
MAT 5500 Differential Equations

Notes:

1. Courses granting four credits at KBCC will fulfill the corresponding three credit John Jay Computer Science Major requirement, plus one elective credit.
2. Students entering math at MAT 1400 or higher: select additional courses to reach the 60 credits required for the Kingsborough AS degree.

Distribution of Coursework between KBCC and JJC

Prerequisites (depending on Math Placement)

At KBCC (0-3 Credits)	At JJC (0 Credits)
MAT 1400 – Analytic Geometry and Pre-Calculus Mathematics[1]	

Part One. Core Computer Science Courses   33 Cr

Required

At KBCC (9 Credits)	At JJC (24 Credits)
CS 1200 Intro to Computing[1]	CSCI 360 Cryptography and Cryptanalysis
CS 1300 Advanced Programming[1]	CSCI 373 Advanced Data Structures
CS 1400 Computer & Assembly Lang Program[1]	CSCI 374 Programming Languages
	CSCI 375 Operating Systems
	CSCI 377 Computer Algorithms
	CSCI 379 Computer Networking
	CSCI 411 Computer Security and Forensics
	CSCI 412 Network Security & Forensics

Part Two. Required Math Courses   9 Cr.

Required

At KBCC (6 Credits)	At JJC (3 Credits)
CS 3500 Discrete Structures[1]	MAT 301 Probability and Mathematical Statistics I
MAT 1500 Calculus I[1]	

Part Three. Electives   6 Cr.

At KBCC (3 Credits)	At JJC (3 Credits)

MAT 5600 Linear Algebra	Select one CSCI 362 Databases and Data Mining CSCI 376 Artificial Intelligence CSCI 380 Selected Topics in Computer Science CSCI 404 Internship in Management Information Systems

Part Four. Ethics   3 Cr.
Required

At KBCC (0 Credits)	At JJC (3 Credits)
	PHI 216 Ethics and Information Technology

Part Five. Capstone Courses   6 Cr.
Required

At KBCC (0 Credits)	At JJC (6 Credits)
	CSCI 400 Capstone Experience in Digital Forensics/Cybersecurity I
	CSCI 401 Capstone Experience in Digital Forensics/Cybersecurity II

Total Credits

At KBCC: 18-24 Credits	At JJC: 39 Credits

Also required for KBCC A.S.: HE 1400 Critical Issues in Health (1 cr), MAT 1600 Calculus II, and the following courses[2]:

MAT/BA 2200: Business Statistics or MAT/BIO 9100 Biostatistics
MAT 2100 Calculus III
MAT 5500 Differential Equations

Notes:

1. Courses granting four credits at KBCC will fulfill the corresponding three credit John Jay Computer Science Major requirement, plus one elective credit.
2. Students entering math at MAT 1400 or higher: select additional courses to reach the 60 credits required for the Kingsborough AS degree.

Attachment A

- Indicate academic calendar type: ☐ Semester ☐ Quarter ☐ Trimester ☐ Other (describe): _____
- 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.

Term: Freshman Year Fall (KBCC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
Req Core: MAT 1500 Calculus I [1]	4	X	X		(placement test)
Flex Core: Creative Expression	3	X			
Req Core: ENG 1200 English I	3	X			
Req Core: Life and Physical Sciences	3	X			
Flex Core: Ind. & Soc.	3	X			
Term credit total: 16	16	16	4		

Term: Freshman Year Spring (KBCC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
CS 1200 Intro to Computing	4	X	X		co: Mat 1400
Flex Core: MAT 1600 Calculus II	4	X	X		MAT 1500
Req Core: ENG 2400 English II	3	X			ENG 1200
Flex Core: MAT/BA 2200: Business Statistics	4		X		(placement)
Term credit total: 15	15	11	12		

Term: Sophomore Year Fall (KBCC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
CS 1400 Computer & Assembly Lang Program	4		X		CS 1200
MAT 55 Differential Equations	3		X		MAT 1600
CS 1300 Advanced Programming	4		X		CS 1200
MAT 2100 Calculus III	4		X		MAT 1600
Term credit total: 15	15	0	15		

Term: Sophomore Year Spring (KBCC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
CS 3500 Discrete Structures	4		X		MAT 1500
MAT 5600 Linear Algebra	3	X	X		MAT 1500
Flex Core: World Cultures	3	X			
Flex Core: US Experience	3	X			
HE 1400 Critical Issues in Health Care	1	X			
Term credit total: 14	14	10	7		

Term: Junior Year Fall (JJC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
Liberal Arts Elective	3	X			
Col Opt Learning fr Past or Com	3	X			
CSCI 373 Advanced Data Structures	3		X		CSCI 272
MAT 301 Probability and Mathematical Statistics I	3	X	X		
(Col Opt) Justice in Global Perspective	3	X			
Term credit total: 15	15	12	6		

Term: Junior Year Spring (JJC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
Liberal Arts Elective	3	X			
CSCI Elective	3		X		CSCI 272
CSCI 377 Computer Algorithms	3		X		CSCI 272
CSCI 375 Operating Systems	3		X		CSCI 272
CSCI 374 Programming Languages	3		X		CSCI 272
Term credit total: 15	15	3	12		

Term: Senior Year Fall (JJC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
CSCI 379 Computer Networking	3		X		CSCI 272
Liberal Arts Elective	3	X			
PHI 216 Ethics & Info Technology	3	X	X		CSCI 360
CSCI 400 Capstone Exp in Cybersecurity I	3		X		CSCI 373
CSCI 411 Computer Security & Forensics	3		X		CSCI 360, 375
Term credit total: 15	15	6	12		

Term: Senior Year Spring (JJC)

Course Number & Title	Cr	LAS	Maj	New	Prerequisite(s)
CSCI 360 Cryptography & Cryptanalysis	3		X	X	MAT 204, CSCI 272
CSCI 401 Capstone Exp in Cybersecurity II	3		X		CSCI 400
CSCI 412 Network Security & Forensics	3		X		CSCI 360, 379
Elective	3				
Elective	3				
Term credit total: 15	15	0	9		

Program Totals: Credits: 60 (A.S.) / 120 (B.S.) | Liberal Arts & Sci: 39 (A.S.) / 60 (B.S.) | Major: 30 (A.S.) / 69 (A.S. + B.S.) | Elective & Other: 30 (A.S.) / 51 (B.S.)

Cr:= credits   LAS = Liberal Arts and Sciences   Maj = major requirement   New = new course   Prerequisite(s) = list prerequisite(s) for the noted courses

1. MAT 900 and MAT 1400 may not be required depending on mathematics placement

Attachment B:

The Department of Mathematics and Computer Science at Kingsborough and the the Department of Mathematics and Computer Science at John Jay College have collaborated on a design and implementation plan for creating a dual Admission Joint B.S. degree in Computer Science and Information Security from the existing John Jay B.S. and Kingsborough A.S Computer Science programs.

John Jay has confirmed that no academic or course-work changes need be made to our existing Kingsborough Computer Science A.S. program for this joint program to commence. John Jay College will consider our Computer Science A.S. courses as equivalents to the foundation courses of this program. The recognition by John Jay of the value our Computer Science graduates bring, as well as the enthusiasm our current students have for this topic and the idea of having this option available to them compel our department to proceed posthaste with the process of facilitating the implementation of this plan. The only "change" that may be needed here at Kingsborough, anticipating greater enrollment once the "Cybersecurity Program" is known to the student body, would be the possible need for additional faculty to meet additional class section enrollment needs.

Our John Jay partners correctly note that:

---[excerpt John Jay program description document]---

"Cybersecurity represents an unusually broad, remarkably well-compensated set of new and emerging occupational areas, offering a surfeit of employment opportunities in New York City due to the severe shortage of qualified cyber-workers. These occupations rank among the fastest growing professional employment opportunities in NYC. The NYC Department of Labor estimates overall growth in cyber-allied fields at over 20% by 2020, with higher projections for selected categories (36.5%), and with near astronomical growth rates anticipated (58.6%) for the most highly skilled by 2022. This explosive growth places New York City second nationally—just behind Washington, D.C.—for cybersecurity employment opportunities. The field offers remarkable earning opportunities for successful college graduates. Entry-level positions in the cybersecurity fields are unusually well-paid, with private sector career entrants earning roughly $60,000 to start, a figure that can double within the first two-years of employment. The number of qualified applicants for cybersecurity occupations, however, has lagged severely behind the number of openings, causing a critical gap in the public and private sectors' security defense and severe shortages of cyber-workers in specific industries, including financial services, healthcare and retail trade--among the largest industries in the NYC economy. In addition, private sector New York employers point to the problem of inappropriately prepared applicants who lack rudimentary familiarity with the professional work world. They also underscore the dearth of knowledgeable and skills-qualified career entrants, which causes long-term job vacancies, limits the productivity of newly hired cybersecurity professionals, and stunts economic growth as the incidence and costs of cybercrime mushroom and place at grave financial risk both businesses and the public. "

--[excerpt end]--

John Jay College has been in communication with the Kingsborough Math and Computer Science Department for the purpose of designing the dual admission/joint degree program (A.S./B.S.) in Computer Science and Information Security that will help address these shortages and deficiencies.

The plan is now completely described and agreed upon by the respective Math and Computer Science Departments, has been approved at John Jay, and awaits Kingsborough governance process approval to actually commence in Fall 2017.

The planned degree aims to:

1) improve student academic success at the community and senior colleges;

2) increase the rate of transfer from the associate degree to the bachelor's degree;

3) bolster preparation and professional development opportunities for students' career entry and success in the cyber security and tech fields, and

4) ensure curricular alignment between the colleges and the needs of cybersecurity and tech employers.

Attachment C:

The impact on the existing program will be in two forms. First, professors teaching Computer Science track courses will introduce more examples and projects related to cybersecurity - not a difficult prospect, and in fact, one that meets with much enthusiasm from Computer Science students and Computer Science faculty alike. Students on the Kingsborough Computer Science A.S. track consistently choose "cybersecurity" as their number one answer to the question of "what additional topic would you like to learn about". This coincides with an actual need in the job market for more graduates with a strong foundation of knowledge in this area. Second, it is expected that the announcement of the joint degree in cybersecurity with John Jay will not only draw more Kingsborough students to Computer Science, but will also draw more students into Kingsborough itself as they would now be able to plan on a potential path to very good jobs following graduation from the programs. It is therefore expected that enrollment will increase.

Attachment D:

This joint program with John Jay College is expected to attract larger numbers of Kingsborough students to the Computer Science A.S. degree track specifically, as well as attracting new students to Kingsborough in general. As we currently have full enrollment in our Computer Science track with courses consistently filling and students often required to wait a semester to get a section, any additional enrollment would necessitate more Computer Science program faculty. However, it should be emphasized that the program can begin with current staff level.

As the dual joint program is being formed from existing programs, we confirm that only candidates with the capacity to complete the requirements of both degrees shall be admitted to a dual-degree program process and evaluation methods are the same as those in the existing registered program. The proposed dual joint program will be subject to Kingsborough's established and ongoing assessment processes for programs, courses, students, and instructors, including academic program review, learning outcomes assessment, and faculty evaluations. In addition, student performance, persistence, and completion in the joint degree will be tracked and addressed to facilitate continuous improvement by relevant staff at Kingsborough and John Jay.