Letter of Articulation
between
Brooklyn College
of the
City University of New York
and
Borough of Manhattan Community College
of the
City University of New York

Brooklyn College agrees to accept into the Bachelor of Science degree program in Computer and Information Science students from Borough of Manhattan Community College who successfully complete the Computer Programming curriculum described below (see Section B for course equivalencies), thereby receiving an Associate in Applied Science degree. Successful completion of the Computer Programming curriculum at Borough of Manhattan Community College includes the attainment of at least a 2.0 overall grade-point average.

Borough of Manhattan Community College and Brooklyn College agree to present the courses noted in the Computer Programming curriculum described below as outlined in each of the colleges' catalogs, and agree to notify each other if course numbers, content or catalog descriptions change. Furthermore, the parties involved understand that any change in course number, content or catalog description may require a modification to this agreement.

It is also understood that the Department of Computer Information Systems at Borough of Manhattan Community College will identify Borough of Manhattan Community College students who wish to participate in the articulation, and will recommend the Computer and Information Science program at Brooklyn College to those who successfully complete the Computer Programming curriculum.

Borough of Manhattan Community College
The City University of New York

Section A

Computer Programming Curriculum
Leading to the Associate in Applied Science (A.A.S.) degree

General Requirements		Credits
ENG 101	English Composition I	3
ENG 201	English Composition II	3
XXX xxx	Electives (Choose not more than one (1) course per category, except in music where two (2) credits may be chosen: HED 100, SPE 100 or SPE 102, English, Social Science, Music or Art, or Science (AST 110, BIO 110, CHE 110, or PHY 110))	10
MAT xxx	Mathematics (Choose from MAT 150, MAT 200, MAT 206, MAT 301 or MAT 402. Please note MAT 012 or MAT 051 or exemption from Elementary Algebra is a prerequisite for MAT 150 and Intermediate Algebra (MAT 056) is a prerequisite for MAT 200 and MAT 206.)	4
Total General Credits		**20**

Curriculum Credits		Credits
CSC 110	Computer Programming I	4
CSC 210	Computer Programming II	4
CSC 320	Systems Analysis	3
CSC 365	Business Systems I	4
CSC 420	Systems Implementation	3
CSC 465	Business Systems II	3
XXX xxx	CIS or CSC Elective (Choose from CIS 340, CIS 345, CIS 440, CIS 445, CSC 230, CSC 310, CSC 330, CSC 410, CSC 430.)	3
ACC 122	Accounting PrinciplesI	4
ACC 222	Accounting Principles II	4
BUS 104	Introduction to Business	3
or		
BUS 200	Business Organizations & Management	3

CED 201	Career Planning	3
and		
CED 315	CIS Internship I (An Accounting, Business Management, CIS or CSC elective may be substituted for CED 201 and CED 315.)	3
XXX xxx	Elective (Choose one course from Accounting, Business Management, CIS, or CSC.)	2
Total Curriculum Credits		**40-41**
Total Program Credits		**60-61**

Computer Programming Program at
Borough of Manhattan Community College
Course Equivalency Listing for
Brooklyn College Computer Programming Degree

Section B

General Requirements			General Requirements		
Course	**Description**	**Crs.**	Course	Description	Crs.
ENG 101	English Composition I	3		Elective	3
ENG 201	English Composition II	3		Elective	3
XXX xxx	Elective (Choose 10 credits from the following and no more than one per category)	10			
		Category I			
HIS 102 or PHI 100	Western Civilization Introduction to Philosophy	3 3	Core 4 or Core 10	Shaping the Western World Knowledge, Existence and Values	3 3
		Category II			
MUS or ART	(110, 220, 230 or 811) (110, 210, 220, 801 or 802)	2 2	Core 2.2 or Core 2.1	Introduction to Music Introduction to Art	2 2
		Category III			
AST 110 or BIO 210 or CHE 118 or CHE 210 or PHY 215	General Astronomy Biology I Fundamentals of Chemistry Chemistry I University Physics I	4 4 4 4 4	PHYS 0.6 or BIO 4 or CHEM 5 or CHEM 1 or PHYS 1	Core Studies 7 Science in Modern Life I (Chemistry or Physics) Core Studies 8 Science in Modern Life II (Biology or Geology)	 4
		Category IV			
SPE 100 or SPE 102	Fundamentals of Speech	3 3	SPE 3 or SPE 3.2	Techniques in Speech Communication (fulfills speech requirement)	3 3
		Category V			
ENG 371 or ENG 372 or ENG 373 or ENG 381	English Literature I English Literature II Introduction to Shakespeare American Literature	3 3 3 3	Core 6	Landmarks in Literature	3

Category V (continued)					
or ENG 382	American Literature II	3	Core 6	Landmarks in Literature	3
or ENG 383	The American Novel	3			
or ENG 391	World Literature	3	or Core 1	Classical Origins of Western Culture	3
or BLK 321	African American Writing from 18th Century to 1940	3	or Core 6	Landmarks in Literature	3
or BLK 322	Contemporary Black Writers	3			
Category VI					
HED 100	Health Education	2	HNSI 6.1	Elective	3
MAT xxx	Mathematics (MAT 206 or 301)	4	MATH 2.9 or 3.3	Pre-Calculus Mathematics or Calculus I (Elective)	3
	Total General Credits	20		Total General Credits	19-22
Curriculum Requirements			**Curriculum Requirements**		
CSC 110	Computer Programming I	4	CIS 0.1	Computers in our Society	3
CSC 210	Computer Programming II	4	CIS 1.5	Programming in C	4
CSC 320	Systems Analysis	3	XXX xxx	Elective	3
CSC 365	Business Systems	4	CIS 2.30	Cobol for Programmers	2
CSC 420	Systems Implementation	3	CIS 60.1	Independent & Group Projects I	3
CSC 465	Business Systems II	3	XXX xxx	Elective	3
XXX xxx	CIS or CSC Elective (Choose one from the following:)		XXX xxx	Elective	
CIS 445 or	Telecommunications Networks	3	CIS 49 or		3
CSC 230 or	Discrete Structures	3	CIS 11 or	Introduction to Discrete Structures Assembly Language Programming for	3
CSC 310 or	Assembler Language & Architecture I	3	CIS 4.1 or	Microcomputers Advanced Programming Techniques	3
CSC 330 or	Data Structures I	3	CIS 15 or	using "C"	3
CSC 410 or	Assembler Language & Architecture II	3	CIS 27 or	Computer Organization	3
CSC 430	Data Structures	3	CIS 22	Data Structures	3
ACC 122	Accounting Principles I	4	ACC I	Elective	4
ACC 222	Accounting Principles II	4	ACC II	Elective	3
BUS 104 or	Introduction to Business	3	ECON 50.1 or	Elective	3
BUS 200	Business Organization & Management	3	BUS 200	Elective	3
CED 201 and	Career Planning				
CED 315	CIS Internship I (CIS or CSC may be substituted.)	3-4			
CIS 445 or	Telecommunications Networks II/LAN	2	CIS 49 or		3
CSC 230 or	Discrete Structures	3	CIS 11 or	Introduction to Discrete Structures	3
CSC 310	Assembler Language & Architecture I	3	CIS 4.1	Assembly Language Programming for Microcomputers	3

(continued)					
or CSC 330	Data Structures I	3	or CIS 15	Programming for Data Structures II	3
or CSC 410	Assembler Language & Architecture II	3	or CIS 27	Computer Organization	3
or CSC 430	Data Structures	3	or CIS 22	Data Structures	
XXX xxx	Elective (Choose one from the following:)				
CIS 445	Telecommunications Network II/LAN	2	CIS 49		
or CSC 230	Discrete Structures	2	or CIS 11	Introduction to Discrete Structures	3
or CSC 310	Assembler Language & Architecture I	3	or CIS 4.1	Assembly Language Programming for Microcomputers	3
or CSC 330	Data Structures I	3	or CIS 15	Programming for Data Structures II	3
or CSC 410	Assembler Language & Architecture II	3	or CIS 27	Computer Organization	3
or CSC 430	Data Structures	3	or CIS 22	Data Structures	3
	Total Curriculum Credits	40-41		**Total Curriculum Credits**	37
	Total Program Credits	60-61		**Total Program Credits**	56-59

Upon completion of the Associate in Applied Science degree in Computer Programming at Borough of Manhattan Community College, the student entering the Bachelor of Science program in Computer and Information Science at Brooklyn College will complete the following curriculum:

CORE STUDIES COURSES

Core Studies I

Classical Origins of Western Culture
3 hours; 3 credits

Introduction to the classical origins of Western civilization through study, in English translation, of Greek and Latin masterpieces that are recognized as landmarks in the evolution of modern thought and as prototypes for the major literary genres. Readings are supplemented by general lectures, films, and slides. (*Not open to students who are enrolled in or have completed Classics 1 or 1.1 or 1.2 or Humanities 10.1.)

Core Studies 1 is administered by the Department of Classics.

Core Studies II

Introduction to Art
2 hours; 2 credits

Survey of history of Western art from classical times to the present day. ((Not open to students who are enrolled in or have completed Art 1.1 or 1.3. or 2.3. or 2.4.)

Core Studies 2.1 is administered by the Department of Art.

2.2 Introduction to Music
2 hours; 2 credits

Introduction to music through the study of works representing different times, places, and peoples. Recorded, concert, and classroom performances. (Not open to students who are enrolled in or have completed Music 9.1 or 11.1.)

Core Studies III

People, Power, and Politics
4 hours; 4 credits

Introduction to the social sciences through the study of power, authority, and social organization in American society. Emphasis on gaining insight into American society in broad terms, as well as in terms of such specific issues as social class, race, gender, community, equality, and opportunity. The unifying theme of the course is an understanding of the nature of power (social and political). A major goal of the course is an understanding of contemporary issues and controversies involving power in America.

Core Studies 3 is administered jointly by the Departments of Political Science and Sociology.

Core Studies IV
The Shaping of the Modern World 3 hours; 3 credits
European and American civilization since 1700 in its global context. Revolution, industrialization, and nationalism as agents of economic, political, social and cultural change. Introduction to historical analysis and argument. Core Studies 4 is administered by the Department of History.
Core Studies V
Introduction to Mathematical Reasoning and Computer Programming 3 hours; 3 credits
The nature of an algorithm and introduction to programming. Formal mathematical systems and proofs; rudiments of probability theory and of combinatorial analysis, with use of the computer as an aid in solving problems. Other simple computer applications. (Not open to students who are enrolled in or have completed any course in computer and information science or to students who have completed any course in computer and information science or to students who have completed a mathematics course numbered 3.20 or higher with a grade of C or higher.) Prerequisite: a high school course in intermediate algebra or Course 2 of the New York State Sequential Mathematics Curriculum, or Mathematics 0.35 or 0.44 with a grade of at least C, or Mathematics 0.36 or .0.04, or the equivalent. Core Studies 5 is administered jointly by the Departments of Mathematics and Computer and Information Science
Core Studies VI
Landmarks of Literature 3 hours; 3 credits
Emphasis on English and American literature; works of European and non-Western cultures. Examples drawn from fiction, drama and poetry. (Students whose native language is not English may delay taking this course until after have completed 96 credits.) Prerequisite: English 2 Core Studies 6 is administered by the Department of English.

Core Studies VII

7.1 Science in Modern Life: Chemistry

A total of 23 hours lecture and 14 hours laboratory per term; 2 credits

Study of basic concepts in chemistry and their implication in modern life. (Not open to students who are enrolled in or have completed Integrated Science 2 or any college course in chemistry, except chemistry 0.7 or 1.1.) Prerequisite: Mathematics 0.02 or 0.22 or equivalent or a passing grade on the CUNY Mathematics Skills Assessment Test.

7.2 Science in Modern Life: Physics

A Total of 23 hours lecture and 14 hours laboratory per term; 2 credits

Study of basic concepts in physics and their implications in modern life. (Not open to students who are enrolled in or have completed Physics 0.1 or 1 or 1.2 or 1.5 or 1.6 or Integrated Science 1.) Prerequisite: Course 2 of the New York State Sequential Mathematics Curriculum or Mathematics 0.04 or a grade of at least C in Mathematics 0.35 or 0.35 or 0.44, or a passing grade in Core Studies 5, or placement in any Mathematics course numbered 2.9 or higher.

Core Studies is administered jointly by the Departments of Chemistry and Physics.

Core Studies VIII

8.1 Science in Modern Life: Biology

A total of 23 hours lecture and 14 hours laboratory per term; 2 credits

Study of basic concepts in biology and their implications in modern life. (Not open to students who are enrolled in or have completed Biology 1 or 3.)

8.2 Science in Modern Life: Geology

A total of 23 hours lecture and 14 hours laboratory per term; 2 credits

Study of basic concepts in geology and their implications in modern life. (Not open to students who are enrolled in or have completed Geology 1.)

Core Studies 8 is administered jointly by the Departments of Biology and Geology.

Core Studies IX

Comparative Studies in African, Asian, Latin American, and Pacific Cultures

3 hours; 3 credits

A multidisciplinary, team-taught course, with two instructors, interrelating two areas of the world; a comparative geographical overview of the two areas or the world; a comparative geographical overview of the two areas, followed by thematic treatment of each area and comparative analysis.

Core Studies 9 is administered by the Core Studies 9 course coordinator under the direction of the Dean of Undergraduate Studies.

Core Studies X
Knowledge, Existence, and Values 3 hours; 3 credits
Philosophy's distinctive ways of understanding and thinking about perennial human questions: "What can I know?"; "What is real?"; "What should my values be?" Contemporary and traditional examples of philosophic analysis and criticism. (Not open to students who are enrolled in or have completed Philosophy 1.1.)
Core Studies is administered by the Department of Philosophy.

*Any CIS or CSC course and a mathematics course with intermediate algebra (e.g., MAT 200 or above) will satisfy the Core 5 requirement.

Foreign Language Requirement
As part of the core curriculum, all baccalaureate students are required to complete one course in a foreign language at Level 3 (the third semester of study at the college level) or to demonstrate an equivalent proficiency by examination, except as modified below. 1. Students who have successfully completed three years of one language in high school and have passed the Regents Level 3 are exempted from the core language requirement. 2. The foreign language requirement presupposes two years of secondary school language study. Students who offer only one year of foreign language study (or none at all) are required to take one or two semesters of college study (Levels 1 and/or 2) before they can take Level 3. A student who has studied a language in high school for a least two years and wants to study a different language at the college level may do so, but this student must complete a minimum of two terms of the new language at the college level to fulfill the core requirement. 3. Students whose native language is not English may be exempted from this requirement by passing one of the competency examinations administered by the Department of Modern Languages and Literatures. 4. Neither blanket nor equivalent credits will be given for introductory courses in a foreign language from which a student has been exempted by examination.
Computer and Information Science
Core Curriculum
The Department of Computer and Information Science participates in the college's core curriculum through Core Studies 5.
B.S. degree program in computer and information science HEGIS code 0701

Department Requirements (42-50 credits)
To enroll in any advance course in computer and information science, students must earn a grade of C or higher in all course prerequisites. A student excused, without credit, from a course may not take the course for credit later, except with permission of the chairperson. Computer and Information Science 1.10 or 1.20 or 2.40. All of the following: Computer and Information Science 2.10, 11, 15, 22, 44. One of the following options: a) Software Option: Computer and Information Science 4 or 4.1; 24; 27 or 28; 25 or 29; 23 or 38; 60.1. b) Computer Engineering Option: Physics 2.3; Computer and Information Science 2.90 or 4.1; 25; 28; 40 or 42; 23 or 24 or 38. Mathematics 3.3, 4.3, and 8.1. Transfer students who receive credit for Mathematics 3.20 and 4.20 are required to take Mathematics 4.31 and 8.1 to satisfy the mathematics requirements for the B.S. degree in computer and information science.
Additional Requirements for a B.S. degree
Candidates for a B.S. degree with a major in computer and information science (including computational mathematics) must complete at least 60 credits in science and mathematics; 24 of these 60 credits must be completed in advanced courses in the major department or departments. These 24 credits must be completed at Brooklyn College with a grade of C or higher in each course. The following courses may be applied toward the 60 credits in science and mathematics: A) All courses in the departments of biology, chemistry, computer and information science, geology, mathematics, physics, and psychology. B) Courses marked with a (•) symbol in the Department of Health and Nutrition Sciences. C) Anthropology and Archaeology 2.4, 16 24.1, 26.1, 26.2, 36, 85.3. Core Studies 5, 7.1, 7.2, 8.1, 8.2 Economics 30.2, 20.3, 31.1, 31.2. Philosophy 13, 33, 42. Physical Education 22.71, 22.75, 23, 30, 51. Sociology 77.1

Note: Students transferring from BMCC with an A.A.S. in Computer Programming who have not taken any of the recommended electives in Section B must take the corresponding Brooklyn College course, except that students should take MAT 4.3 instead of MATH 4.20 and may substitute another elective from * the list below for CIS 49. Students can also receive credit for Brooklyn College's CIS 2.60 (2 credits) if they take CIS 220 at BMCC but this does not satisfy a requirement for the major.

In addition, students must take following:

Course	Description	Crs.
CIS 25	Operating Systems	3
CIS 23	Analysis of Algorithms	3
or		
CIS 38	Theoretical Computer Science	3
*	One course chosen from:	
	Advanced Personal Computer	
	Technique for Business	
CIS 13.2	Application	3
CIS 23	Analysis of Algorithms	3
	(If the student took CIS 38 above)	
CIS 24	Programming Languages	4
CIS 29	Compiler Construction	3
CIS 32	Artificial Intelligence	3
CIS 38	Theoretical Computer Science	3
	(If the student took CIS 23 above)	
	Microcomputer Systems	
CIS 40	Programming	3
CIS 41	Computer Graphics	3
CIS 42	Microprocessors	3
CIS 43	Real-Time Systems	
CIS 44	File Processing	
	Information Organization and	
CIS 45	Retrieval	3
CIS 46	Workstation Programming	3
CIS 46.5		
	Introduction to Modeling and	
CIS 48	Simulation	3
CIS 51		
CIS 52		
CIS 55		
	Special Topics in Computer	
CIS 70.1	Science	3
	(This assumes student has taken CIS 445 at BMCC. If not, the student must take two courses from this list, or one course from the list and CIS 49.)	
Math 4.3	Calculus II	4
	(If the student has not taken MAT 302 at BMCC.)	
Math 4.31	Infinite Series	1
	(If the student has taken MAT 302 at BMCC.)	
Math 8.1	Probability and Statistics	3

Students must take whichever of the courses (CIS 4.1 and 11 and 15 and 22 and 27) for which they have not received transfer credit.