

ADVICE to UNDERGRADUATES

***C++ version:
for students who began CISC courses before Sept., 2017***



Computer and Information Science

2109 Ingersoll Hall
Brooklyn College, City University of New York
Brooklyn NY 11210

(718) 951-5657

Error! Hyperlink reference not valid.

cis@sci.brooklyn.cuny.edu

Chairperson:	Prof. Y. Langsam	2109N	951-5657
Undergraduate Deputy Chair (CLAS):	Prof. M. Augenstein	2122N	951-5000 x2041
Undergraduate Deputy Chair (SGS):	Prof. J. Thurm	2109N	951-5657
Director, B.S. in Information Systems:	Prof. I. Rudowsky	1417N	951-5000 x2062
Graduate Deputy Chair:	Prof. P. Whitlock	1212N	951-5000 x2069

This brochure is intended to be a summary of the rules applicable to undergraduate study in computer science at Brooklyn College. as of the date of its publication. The Brooklyn College Bulletin (available on the College website at <http://www.brooklyn.cuny.edu/pub/bulletins.htm>) is the official statement of the rules and regulations and should be consulted for final resolution of any questions.

This brochure has been updated to the new course numbers effective September, 2010. For a list matching new course numbers to old course numbers, go to http://www.brooklyn.cuny.edu/courses/new_crs_num.jsp

Brochure Preparation:

Jacqueline A. Jones, Editor
Keith Harrow
Yedidiah Langsam
Aaron Tenenbaum



Effective Date:

September, 2017

TABLE OF CONTENTS

SECTION	TITLE	PAGE
I.	Why Study Computer Science at Brooklyn College?	4
	Advice to Transfer Students	4
II.	Undergraduate Programs at Brooklyn College	6
	1) Major in Computer Science	7
	Additional Requirements for All CIS B.S. Degrees	8
	Personalizing Your Major	9
	Prerequisite Diagram	10
	Possible Schedules for a CS Major	11
	2) Major in Multimedia Computing	13
	Prerequisite Diagram	14
	Possible Schedules for an MMC Major	15
	3) Major in Information Systems	17
	Prerequisite Diagram	18
	Possible Schedules for an IS Major	19
	4) Minor in CIS	21
	5) Minor in Multimedia Computing	21
	6) Minor in Cognitive Science	22
	7) Major in Computational Mathematics	23
III.	Answers to Common Questions about CIS	25
IV.	Courses Offered by the CIS Department	29
	Honors at Graduation	34
V.	Computer and Library Facilities	35
	Internet Resources	35
	News and Announcements	36
	The CISTalk List	36
VI.	Student Societies	37
VII.	Faculty and Staff	38

I. WHY STUDY COMPUTER SCIENCE AT BROOKLYN COLLEGE?



In August, 2007, an article on aol.com said, "Computer science is now hip and chic, thanks in part to high job availability and salary potential. According to the National Science Foundation, computer science graduates at the bachelor's level are more likely than graduates in other fields to be employed full time after graduation, and upon entering the workforce, they are rewarded with higher salaries. The U.S. Bureau of Labor & Statistics reports the median annual earnings of computer applications software engineers who work full time in May 2004 were about \$74,980. The middle 50 percent earned between \$59,130 and \$92,130. The lowest 10 percent earned less than \$46,520, and the highest 10 percent earned more than \$113,830."

Brooklyn College has the largest computer science program in CUNY, and the department is also recognized for excellence. An outside evaluation by a group of distinguished computer science faculty ranked Brooklyn College's Computer and Information Science (CIS) Department as one of the best in the New York metropolitan area. The faculty is actively engaged in research in which students may become involved. Moreover, we offer relatively small classes and excellent computing facilities.

The prospective student should understand that "computer science" is quite different from "data processing" or simply "programming." In our programs, we stress the practice of computing, but we are also concerned with the underlying theory and the mathematics of computation. These concerns are not usually present in a program that exclusively emphasizes the use of computers in commercial installations. We try to make the student a competent programmer and analyst, but we also want to provide an understanding of the theoretical foundations of our subject. This balanced program of commercial, scientific, and theoretical courses enables our graduates to grow

ADVICE TO TRANSFER STUDENTS

Students who plan to transfer to Brooklyn College and major in CIS are advised to take courses in C++, C, or Java, precalculus or calculus, and other courses that are equivalent to courses in the Brooklyn College CIS majors. Transfer students who receive advanced elective credit for courses at other institutions must nevertheless take an additional 24 advanced elective credits at Brooklyn College.

Students in a community college who wish to transfer to Brooklyn College are strongly advised to obtain an A.S. or A.A. degree, rather than an A.A.S. degree. Students coming to Brooklyn College with an A.A. or A.S. degree will be exempt from nine lower-tier Core courses at Brooklyn, but students with an A.A.S. degree will likely have to take a good number of these courses.

Transfer students who have taken a programming course but who have not taken a course in C++ or C before transferring should take CISC 1180 before taking any other CIS course at Brooklyn College numbered above 2820.

Students planning to transfer to Brooklyn College should consult a transfer advisor at their school, or email one of the Deputy Chairs (addresses on the cover) to make sure their community college program is appropriate for their goals. After transferring, transfer students should consult a Deputy Chair as soon as possible for counseling and evaluation of credits.

professionally and to keep pace with rapid changes in the field. In the Information Systems major, we also include knowledge of the business world and of accounting and finance. In the Multimedia major, we include familiarity with the arts and with web design.

Students who graduate from our program are prepared for a variety of endeavors, either for graduate school leading to a career in the academic world or research or for management positions in industry, or for entry into the business community. Graduates of the Brooklyn College CIS Department are teaching at a number of prestigious universities, working at Microsoft, Google, Verizon, AT&T, Citibank, IBM, Metropolitan Life, National Grid, Con Edison, the Port Authority, CBS, J. P. Morgan Chase, and other major corporations.

For information on potential careers in computing, please see the ACM Careers web site at <http://computingcareers.acm.org/>.

II. UNDERGRADUATE PROGRAMS

The Department of Computer and Information Science (CIS) offers a very rich undergraduate program in computer science, as well as a graduate program leading to advanced degrees.



Undergraduate Programs

- a major in Computer Science, leading to the B.S. degree
- a major in Information Systems, leading to the B.S. degree
- a major in Multimedia Computing, leading to the B.S. degree
- a minor in Computer and Information Science
- a minor in Multimedia Computing
- a minor in Parallel and Distributed Computing
- a minor in Cognitive Science
- a joint major with the Department of Mathematics in Computational Mathematics, leading to the B.S. degree

The undergraduate offering at College is Brooklyn quite extensive and includes some courses that are offered only at the graduate level in many other schools. There is a very strong emphasis on the discipline of programming, with substantial practical assignments in many of the courses. The programming language emphasized throughout the undergraduate program is C++, and a course in Java is required. A number of other languages may be taken as electives.

Declaring a Major

Choosing a major is typically done during the sophomore year. Students who wish to declare themselves as CIS majors should do so through the Brooklyn College WebCentral portal, <http://www.portal.brooklyn.edu>. Anyone wishing to consult an advisor should see Professor Moshe Augenstein (day; room 2122N, 951-5000 x5041; augenstein@sci.brooklyn.cuny.edu) or Professor Joseph Thurm (evening; room 2109N, 951-5657; thurm@sci.brooklyn.cuny.edu). Students interested in the Information Science major should consult Prof. Ira Rudowsky (room 1417N, 951-5000 x2062) rudowsky@sci.brooklyn.cuny.edu. Their office hours are posted outside the department office, room 2109N.

Students interested in graduate (Master's and/or Ph.D.) programs should contact the Graduate Deputy Chairperson, Professor Paula Whitlock, room 1212N, 718-951-5000, x2069; whitlock@sci.brooklyn.cuny.edu.

The Major in Computer Science (HEGIS code 0701)



This major is designed for students who have a general interest in computers and programming. It is suitable for those who want to work as a programmer or systems analyst, or for someone with an interest in going to graduate school in computer science. It is preparation for all non-specialized fields of computing.

COMPUTER SCIENCE MAJOR REQUIREMENTS (54-57 credits)

One of the following:

CISC 1110 or 1180

All of the following:

CISC 2210, 3110, 3120, 3130, 3140, 3150, 3310*, 3320

CISC 3220 or 3230

CISC 4900 or 5001

CISC 2820W or PHIL 3318W

MATH 1201 and 1206; or 3.20 and 4.20 and 1211

MATH 2501 or 3501

Two additional courses in CIS numbered between 3000 and 4899.

The department chair, with the approval of the chair of the department's undergraduate curriculum committee, may allow substitutions for one or more of these requirements consistent with the educational goals of the program.

Important Note: To enroll in a CIS course, a student must have passed all prerequisite courses in the CIS department with a grade of C or higher. This is different from the policy of many other departments. This requirement does not apply to Math prerequisite courses, which must be passed with a D- or better.

For titles and prerequisites of these CIS courses, see Section IV of this brochure. For descriptions, see the Brooklyn College Bulletin.

*Students who have enrolled in CIS 27 (CISC 3305) before Spring, 2008, may substitute completion of that course for CISC 3310. Students who enrolled in CIS 4.1 (CISC 1341) before Spring, 2008, but who did not complete CIS 27 (CISC 3305), must complete CISC 3310 to meet the requirements of the program.

Mathematics 1201 (3 credits) and 1206 (4 credits) are courses in calculus; Mathematics 2501 (3 credits) and 3501 (3 credits) are courses in probability and statistics. Transfer students who receive credit for Mathematics 3.20 and 4.20 are required to take Mathematics 1211 and either 2501 or 3501 to satisfy the mathematics requirement for the B.S. degree in Computer and Information Science. Students may be required to take Mathematics 1011 (precalculus) before taking Mathematics 1201.

Additional Requirements for B.S. in CS, MMC or Computational Math

CIS candidates for a CIS B.S. degree in Computer Science, Multimedia Computing, or Computational Math must complete at least 60 credits in science and mathematics; 24 of these 60 credits must be advanced courses numbered 2000 and above taken in the CIS Department at Brooklyn College and completed with a grade of C or higher in each course. For the B.S. in Computational Math, these 24 credits must be in the CIS Department and/or the Math Department.

Ordinarily, a Brooklyn College CS or MMC major will meet the 24-credit requirement through required CIS courses and will not require additional CIS courses. Additional CIS, math, and science courses, of course, are always helpful. Students should make sure that they meet the 60-credit science requirement.

The following courses may be credited as science courses for the B.S. degree: All courses in the Departments of Biology, Chemistry, Computer and Information Science, Geology, Mathematics, Physics, and Psychology; B) Courses in the Dept. of Health and Nutrition Sciences marked with a (#) in the Bulletin; Anthropology and Archaeology 2200,

Transfer students should plan their schedules carefully to ensure that they take 24 advanced CIS electives at Brooklyn College.

3199, 3230, 3240, 3250, 3260, 3265, 3266, 3425, 3440, 3470, 4665; Core Studies 5, 5.1, 5.2, 7.1, 7.2, 8.1, 8.2; any Core Curriculum course numbered in the 1300s or 3300s; Economics 3400, 3410, 4400, 4422; Philosophy 3203, 3204, 3231, 3232, 3422, 3423, 3601, 3605, 3610; Physical Education and Exercise Science 3023, 3271, 3275, 3281, 4229, 4251; and Sociology 2701.

Department Recommendations

- CIS majors must complete their General Education requirements.
- Incoming students who know computer programming should consult a department advisor.
- Each student should, with counseling, take additional elective courses that will satisfy the student's special interests. These may include courses in computer and information science as well as courses in mathematics, economics, accounting, physics, biology, psychology, health and nutrition sciences, or other departments. By taking these courses, the student will also be prepared to apply computing to a particular field.
- Any student who is not familiar with Microsoft Word, Excel, Access and/or PowerPoint is advised to also take CISC 1050 during his or her college studies.
- **Seniors with good grades may also take graduate courses, with permission.**



Students should try to gain experience on as many computer platforms as possible. In the CIS Department, we offer courses on personal computers running Windows and Unix workstations. It is to your advantage to take courses using both platforms so that you are broadly knowledgeable and have the widest experience and career choice possibilities.

Personalizing Your Major



Going to Graduate School?

Students interested in graduate study in computer science should consider taking CISC 3160, 3220, 3230, and 3390



Scientifically Inclined?

Those CIS majors who want to specialize in scientific applications would do well to include in their program of study courses from the following list:

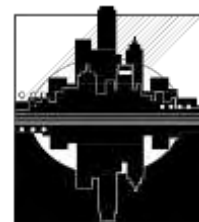
CISC 1150, 2810, 3350, 3820, 4335
MATH 2101, 2201, 2206, 4201



Going into Business?

Those CIS majors who want to specialize in business, commercial, and economic applications would do well to include in their program of study courses from the following list:

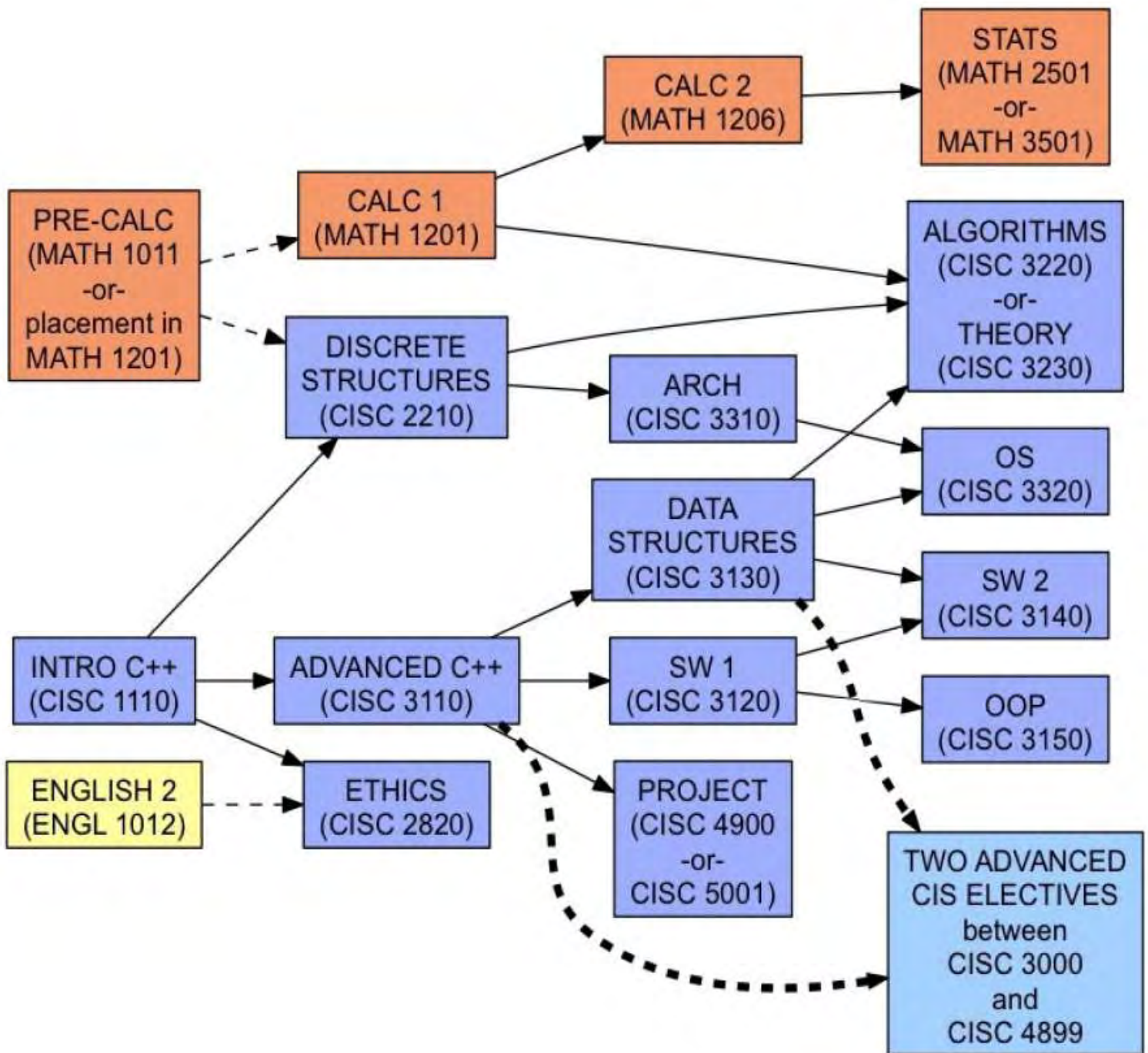
CISC 1050, 1530, 1590, 1595, 1597, 2531, 3810, 3820
ECON 2100, 3320, 3400
ACCT 2001, 3001, 3041
BUSN 3100, 3200, 3230, 3310, 3430



Politically Motivated?

CIS majors who want to specialize in urban administration and information science should include as many courses as possible from the following list:

CISC 1050, 3810, 3820
POLS 1001 or 1002 (or CORC 1230 instead of either one), 3120, 3123, 3140, 3141, 3143, 3144, 3150, 3152, 3610, 3611



Prerequisite Flowchart for the BS in Computer Science

Possible Schedules for the CS Major



Students wishing to major in CIS are encouraged to see a department counselor as early as possible. *The schedules below are appropriate for non-transfer students.

The following suggestions are offered to help a student arrange the required courses into a feasible schedule. Many other arrangements are possible, and each student should consider the prerequisites for the individual courses before planning his or her schedule. Students should also take General Education courses as appropriate. Students may also take other advanced elective courses that are not required for the major.

It is important to move speedily through the CISC 1110, 3110, 3130 sequence, as completing that set of courses allows a student to take most other courses in the department.

In the schedules below, elective means any course in CIS numbered from 3000 to 4899.

Four Year Schedule

First semester: CISC 1110, and MATH 1011 or 1201
Second semester: CISC 2210, CISC 3110, and MATH 1201 or 1206
Third semester: CISC 2820W, CISC 3130
Fourth semester: CISC 3120, CISC 3310, and MATH 1206 or 2501
Fifth semester: CISC 3140, and either CISC 3220 or CISC 3230
Sixth semester: CISC 3150, CISC 3320, and MATH 2501 (if necessary)
Seventh semester: CISC 4900 or 5001, and one elective
Eighth semester: one or more electives, possibly CISC 4905 or 5002

For students who decide to major in CIS in their second year, we recommend the following schedule of required courses:

Three Year Schedule

Third semester: CISC 1110, MATH 1011 or 1201
Fourth semester: CISC 2210, CISC 3110, MATH 1201 or 1206
Fifth semester: CISC 2820W, CISC 3130, CISC 3310, MATH 1206 or 2501
Sixth semester: CISC 3120, CISC 3220 or 3230, 3320 or 3150,
MATH 2501 if needed
Seventh semester: CISC 3140, CISC 3320 or 3150, and one elective
Eighth semester: CISC 4900 or 5001, and one elective

Although not recommended, the following schedule is feasible for students who take CISC 1110 in their fourth semester. Since this program is very difficult to handle, it is critical that the student should see a counselor before undertaking this schedule and every semester thereafter.

Two-and-One-Half Year Schedule

Fourth semester: CISC 1110, CISC 2820W, and MATH 1011 or 1201, CISC 3800

Fifth semester: CISC 2210, CISC 3110, MATH 1201 or 1206, CISC 3800

Sixth semester: CISC 3120, CISC 3130, CISC 3310, MATH 1206 or 2501

Seventh semester: CISC 3140, CISC 3220 or 3230, CISC 3320 or 3150,
MATH 2501 if needed

Eighth semester: CISC 3150, CISC 4900 or 5001, one or more electives

Note: MATH 1011 or placement in MATH 1201 by the Dept. of Mathematics, is a prerequisite for CISC 2210.

Freshmen and sophomores are also encouraged to complete their General Education and English requirements, and to start the Math requirements for the CIS major.

Students who are required to take a foreign language should satisfy that requirement as quickly as possible.

The Major in Multimedia Computing (HEGIS code 0799)



This major is designed for students interested in the types of computing that are used for entertainment, art and aesthetics. The major melds work in the Arts, Mathematics and Computer Science to produce students who are comfortable applying computing to non-traditional applications such as robotics, computer gaming, web production, and arts production. Building on our several-year-old minor in the field, the new major is designed to provide preparation for the increasing number of computing careers in the arts and entertainment industries.

MULTIMEDIA COMPUTING MAJOR REQUIREMENTS (57-59 credits)

All of the following:

CISC 1110 or 1180

CISC 1600, 2210, 3110, 3120, 3130, 3220, 3620, 3630

CISC 4900 or 5001

All of the following:

MATH 1201; 1711 or 1206; 1716 or 2501

One of the following:

CISC 3650, 3660, 3665

Two additional courses chosen from the following:

CISC 3140, 3150, 3410, 3415, 3610, 3650, 3660, 3665, 3810, 4610

Two courses chosen from among the following:

Art (ARTD) 2811, 2812, 2820, 2821, 3812

Music (MUSC) 3260, 3261, 3262, 3322

FILM 1201, 2701

Television and Radio (TVRA) 2420, 3861, 3871, 3951

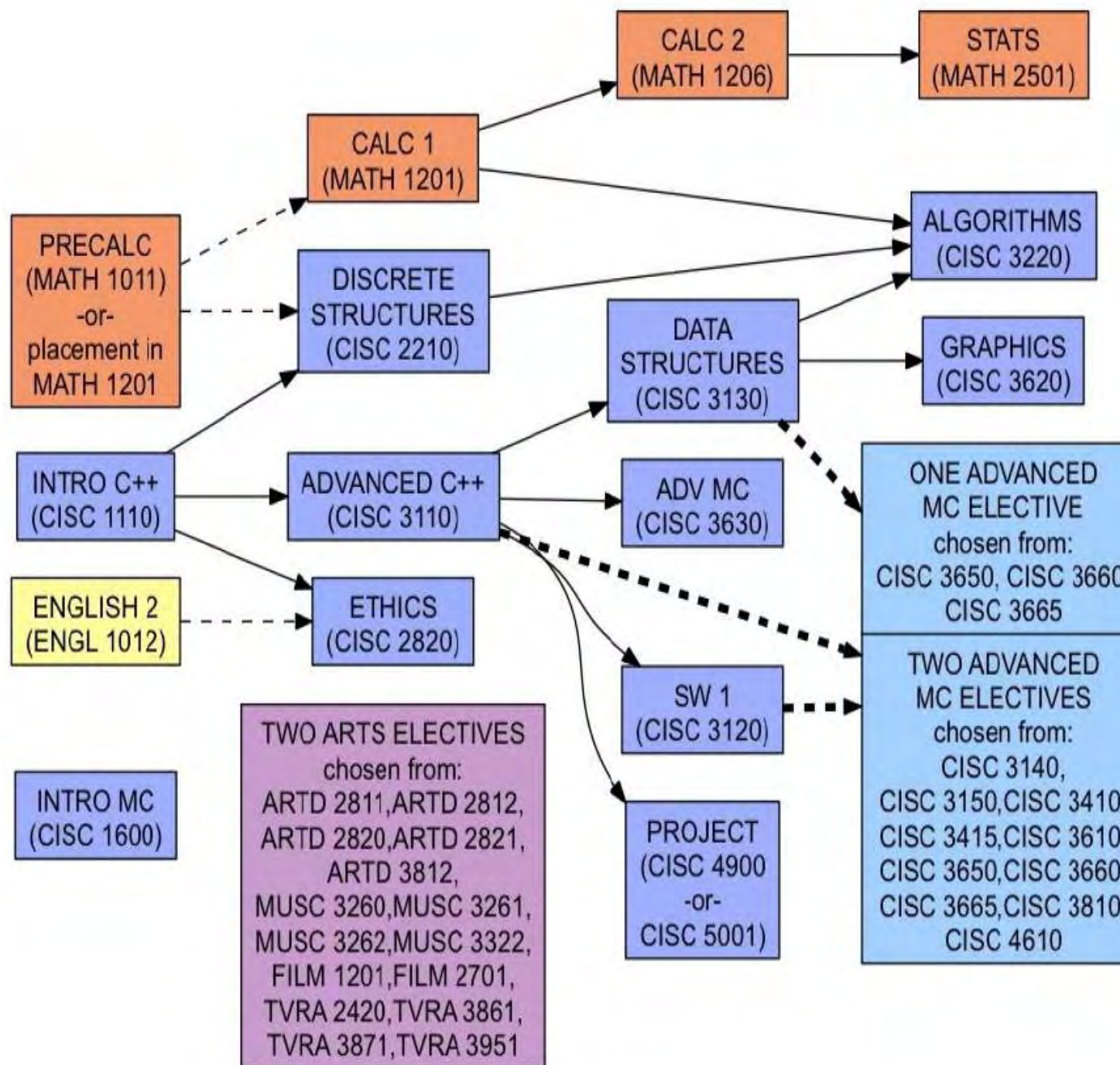
A candidate this degree must also fulfill the science requirements listed on page 8.

The department chair, with the approval of the chair of the department's undergraduate curriculum committee, may allow substitutions for one or more of these requirements consistent with the educational goals of the program.

For titles and prerequisites of these CIS courses, see Section IV of this brochure. For descriptions, see the Brooklyn College Bulletin.

Recommendation: It is recommended that students in this program fulfill their writing-intensive course requirement with CISC 2820W or Philosophy (PHIL) 3318W.

Important Note: To enroll in a CIS course, a student must have passed all prerequisite courses in the CIS department with a grade of C or higher. This is different from the policy of many other departments. This requirement does not apply to Math prerequisite courses, which must be passed with a D- or better.



Prerequisite Flowchart for the BS in Multimedia Computing

Possible Schedules for the MMC Major*

Students wishing to major in Multimedia Computing are encouraged to see a department counselor as early as possible. *The schedules below are appropriate for non-transfer students.

The following suggestions are offered to help a student arrange the required courses into a feasible schedule. Many other arrangements are possible, and each student should consider the prerequisites for the individual courses before planning his or her schedule. Students should also take Core courses as appropriate. Students may also take other advanced elective courses that are not required for the major.

It is important to move speedily through the CISC 1110, 3110, 3130 sequence, as completing that set of courses allows a student to take most other courses in the department.

In the schedules below, a CIS MMC elective is an additional course chosen from among CISC CISC 3140, 3150, 3410, 3415, 3610, 3650, 3660, 3665, 3810, 4610

Four Year Schedule

First semester: CISC 1110, CISC 1600, ENGL 1010, MATH 1011
Second semester: MATH 1201, ENGL 1012
Third semester: CISC 2820W, CISC 3110, MATH 1206
Fourth semester: CISC 2210, CISC 3120, arts elective
Fifth semester: CISC 3130; CISC 3630, MATH 2501
Sixth semester: CISC 3220, CISC 3650 or 3660 or 3665, arts elective
Seventh semester: CISC 3620, MMC elective, CISC 4900 or 5001
Eighth semester: CIS MMC elective; CISC 4905 or CISC 5002 (optional)

For students who decide to major in Multimedia Computing in their second year, we recommend the following schedule of required courses:

Three Year Schedule

Third semester: CISC 1600, MATH 1011, arts elective
Fourth semester: CISC 1110, MATH 1201, arts elective
Fifth semester: CISC 2210, CISC 2820W, CISC 3110, MATH 1206
Sixth semester: CISC 3120, CISC 3630, MATH 2501
Seventh semester: CISC 3130, CISC 3650 or 3660 or 3665; CIS MMC elective
Eighth semester: CISC 3220, CISC 3620, CIS MMC elective; CISC 4900 or 5001

Note: Mathematics 1011 or placement in MATH 1201 by the Dept. of Mathematics, is a prerequisite for CISC 2210.

Freshmen and sophomores are also encouraged to complete their General Education and English requirements and to start the Math requirements for the MMC major.

Students who are required to take a foreign language should satisfy that requirement as quickly as possible.



This major, offered in a program taught jointly between the CIS department and the Dept. of Finance and Business Management, is designed for students who want to use their computing skills in the field of business and organizational management. Combining a broad education in computing with the extensive "business intelligence" that today's organizations are seeking from their information technology staffs, the major will prepare students for such careers as Business Analyst, Systems Analyst, Database Administrator, Information Technology Specialist, and Information Consultant.

INFORMATION SYSTEMS MAJOR REQUIREMENTS (62-65 credits)

All of the following:

CISC 1110 or 1180
CISC 3110, 3120, 3130, 3810
CISC 4900 or 5001

Students unfamiliar with PC application software (word processing, spreadsheet software, database management software, and presentation software) should also complete CISC 1050. Knowledge of such software is prerequisite for CISC 3810.

Two courses chosen from the following:

CISC 3140, 3150, 3171, 3340, 3345, 3410, 3800, 3820

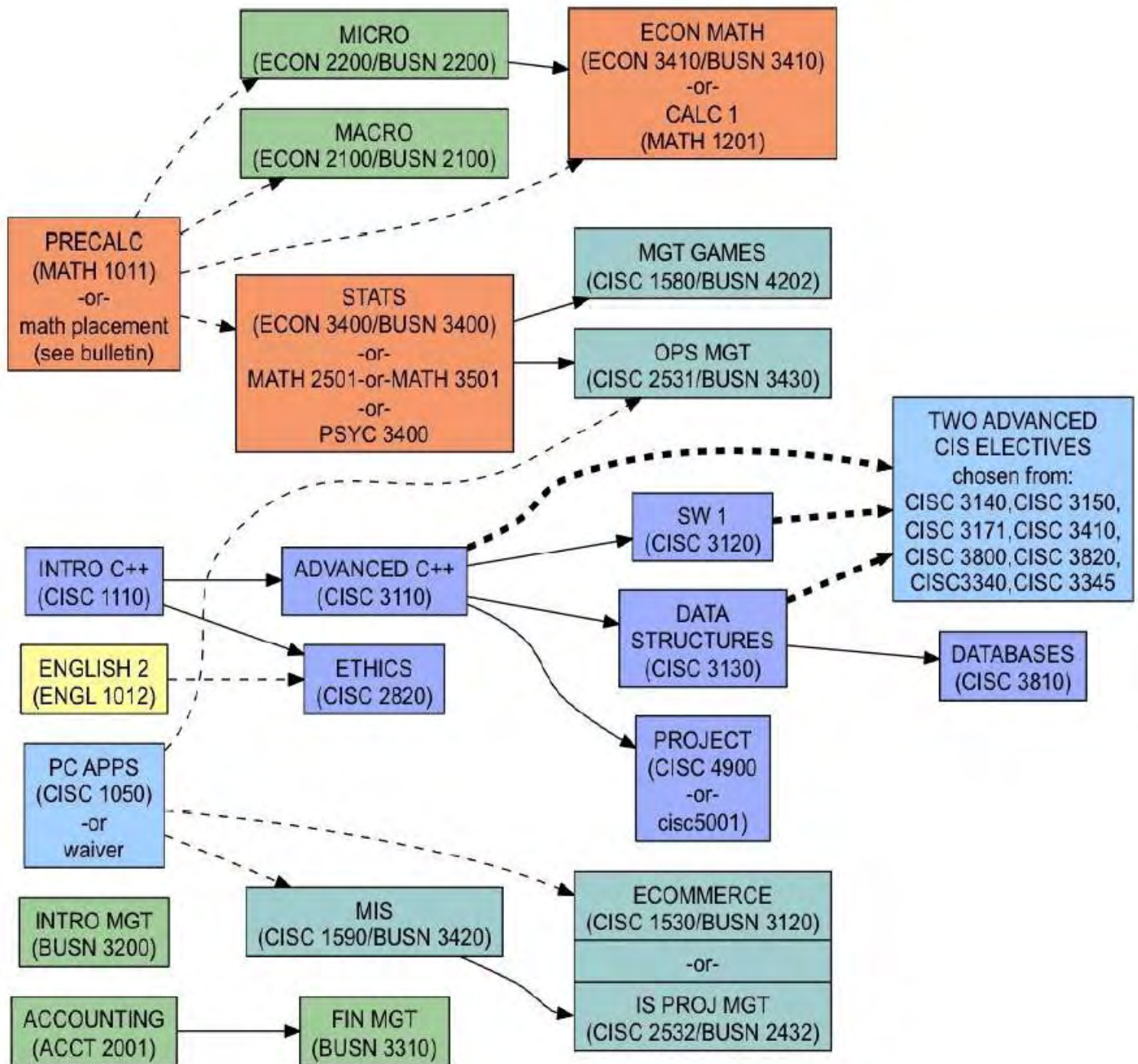
With permission of the chairperson of the Department of Computer and Information Science, the student may substitute one of the following courses for any course in the two-course choice above: CISC 3160, 3220, 3310, 3320, 3630.

All of the following:

CISC 2820W or Philosophy (PHIL) 3318W
Business (BUSN) 3420 or CISC 1590
BUSN 3430 or CISC 2531
BUSN 3120 or CISC 1530 or BUSN 3432 or CISC 2532
BUSN 4202W or CISC 1580W
ECON 2100 or BUSN 2100
ECON 2200 or BUSN 2100
BUSN 3200 and 3310
Accounting (ACCT) 2001
BUSN 3400 or ECON 3400 or MATH 2501 or MATH 3501 or Psychology (PSYC) 3400
BUSN 3410 or ECON 3410 or MATH 1201

A candidate for this degree must complete 24 credits in advanced courses in the Departments of Accounting, CIS, Economics, and/or Finance and Business Management. These courses must be completed at Brooklyn College with a grade of C or higher.

Important Note: To enroll in a CIS course, a student must have passed all prerequisite courses in the CIS department with a grade of C or higher. This is different from the policy of many other departments. This requirement does not apply to MATH prerequisite courses, which must be passed with a D- or better.



Prerequisite Flowchart for the BS in Information Systems

Possible Schedules for the IS Major*

Students wishing to major in Multimedia Computing are encouraged to see a department counselor as early as possible. *The schedules below are appropriate for non-transfer students.

The following suggestions are offered to help a student arrange the required courses into a feasible schedule. Many other arrangements are possible, and each student should consider the prerequisites for the individual courses before planning his or her schedule. Students should also take Core courses as appropriate. Students may also take other advanced elective courses that are not required for the major.

It is important to move speedily through the CISC 1110, 3110, 3130 sequence, as completing that set of courses allows a student to take most other courses in the department.

In the schedules below, a CIS IS elective is CISC 3800 or 3120 or 3140 or 3171 or 3410 or 3820 or 3340 or 3345.

Four Year Schedule

First semester: CISC 1110, CISC 1050, MATH 1011, ENGL 1010
Second semester: CISC 1530, CISC 3110, BUS 2100, ENGL 1012
Third semester: CISC 2820W, CISC 3130, BUS 2200, BUS 3200
Fourth semester: CISC 1590, CISC 3810, BUS 3400
Fifth semester: CISC 2531; CISC 3150; one CIS IS elective
Sixth semester: one or more CIS IS electives; BUS 3410
Seventh semester: CISC 1580W; CISC 4900 or CISC 5001; ACCT 2001
Eighth semester: CISC 4905 or CISC 5002, additional CIS or Business electives, BUS 3310

For students who decide to major in Information Systems in their second year, we recommend the following schedule of required courses:

Three Year Schedule

Third semester: CISC 1110, CISC 1050, MATH 1011, BUS 3200
Fourth semester: CISC 1530, CISC 1590, CISC 3110, BUS 2100
Fifth semester: CISC 2820W, CISC 3130, BUS 2200, BUS 3400
Sixth semester: CISC 2531, CISC 3810, one CIS IS elective, BUS 3410
Seventh semester: CISC 3150; one or more CIS IS electives; ACCT 2001
Eighth semester: CISC 1580W; CISC 4900 or CISC 5001; BUS 3310

Although not recommended, the following schedule is feasible for students who take CISC 1110 in their fourth semester. Since this program is very difficult to handle, it is critical that the student should see a counselor before undertaking this schedule and every semester thereafter.

Two-and-One-Half Year Schedule

Fourth semester: CISC 1110, CISC 1050, MATH 1011, BUS 3200
Fifth semester: CISC 1530, CISC 1590, CISC 3110, BUS 2100, ACCT 2001
Sixth semester: CISC 2820W, CISC 3130, BUS 2200, BUS 3400
Seventh semester: CISC 2531, CISC 3810, one CIS IS elective, BUS 3410, BUS 3310
Eighth semester: CISC 3150, one CIS IS elective, CISC 1580W; CISC 4900 or 5001

Note: Mathematics 1011 or placement in MATH 1201 by the Dept. of Mathematics, is a prerequisite for CISC 2210.

Freshmen and sophomores are also encouraged to complete their General Education and English requirements and to start the Math requirements for the IS major.

Students who are required to take a foreign language should satisfy that requirement as quickly as possible.

The Minor in Computer Science



Students can officially minor in CS by taking 12 credits in CIS advanced electives, including at least one of 3120 or 3130 or 3310. At least 6 of the credits presented for the minor must be completed at Brooklyn College. The 12 advanced elective credits must be completed with an average of C or better.

Three possible minors are the following:

- a) CISC 1110, 2210, 3110; 3120 or 3130; and 3310
- b) CISC 1110, 1050; 2531 or 2210; 3800, 3110; and 3120 or 3130 or 3630
- c) CISC 1110, 3110; 3120 or 3130; and two additional courses numbered 2000 or above (however, make sure that you fulfill any prerequisites).

Any student who is not familiar with Microsoft Word, Excel, Access and/or PowerPoint is advised to also take CISC 1050 during his or her college studies.



The Minor in Multimedia Computing

A student with a major in CIS or another field may take a minor in Multimedia Computing. Any minor at BC requires completing 12 advanced elective credits with an average of C- or better. The minor requires 25-27 credits and includes the following courses.

MULTIMEDIA COMPUTING MINOR REQUIREMENTS

All of the following:

CISC 1110 or 1180
CISC 1600, 3110, 3120, 3130
CISC 3620 or 3630

Two courses chosen from among the following:

CISC 3610, 3620, 3630, 3650, 3660, 3665, 4610

Courses presented for the major in CIS may also be used to satisfy the minor in multimedia computing.

The Minor in Cognitive Science



The CIS Department offers a minor in Cognitive Science. The minor requires 12-13 credits in advanced electives. The 12 advanced elective credits must be completed with an average of C- or better. This is an interdepartmental minor, offered by the CIS, Philosophy and Psychology departments. The minor includes the following courses.

COGNITIVE SCIENCE MINOR REQUIREMENTS

All of the following:

PHIL 3422

CISC 1110

PSYC 1000 and 3530

One from each of the following groups, a) and b):

a) PHIL 3123, 3410, 3401, 3420, or 3601.

b) CISC 1410 or 3410; or PHIL 29, or PSYC 3580.

The Major in Computational Mathematics (HEGIS code 1701)



The Computational Mathematics program, offered jointly by the Department of Mathematics and the Department of Computer and Information Science, prepares the student for a wide range of future careers and opportunities for graduate study. The Computational Option enables students to apply mathematical and computational skills to the physical, biological, social and behavioral sciences. It is designed for the education of applied mathematicians who plan to enter careers in scientific computing, or who wish to enroll in graduate programs in computationally oriented applied mathematics or in computer science. The Theoretical Option is designed for those interested in the more abstract parts of computer science, and for those interested in college teaching and research.

COMPUTATIONAL MATHEMATICS PROGRAM REQUIREMENTS (49-58 credits)

Option I. Computational

One of the following mathematics sequences, a) or b)

a) MATH 1201 and 1206

b) MATH 3.20 and 34.20 and 1211

All of the following:

MATH 2001, 2101, 2201, 2206, 4201, 3501, and 4701

CISC 1110 or 1180

CISC 3110, 3120, 3130, 3220

Two courses chosen from the following:

CISC 3240 or MATH 3107; CISC 3150, 3160, 3230, 3310, 3330, 3350, 3820, 4335

Recommendations: Students choosing Option 1 are also encouraged to minor in Distributed and Parallel Computing.

Option II. Theoretical

One of the following mathematics sequences, a) or b)

a) MATH 1201 and 1206

b) MATH 3.20 and 34.20 and 1211

All of the following:

MATH 2001, 2101, 2201, 3101, 4101, and 4201

CISC 1110 or 1180

CISC 3110, 3120, 3130, 3220, 3230, 4900

CISC 4900 or 5001

Two of the following:

CISC 3240 or MATH 3107; CISC 3150, 3160, 3330, 3350, 3820, 4335

Important Note: Candidates for a degree in Computational Mathematics must also fulfill the requirements listed on page 8 of this brochure.

RECOMMENDATIONS: MATH 4501 is recommended. It is recommended that students should choose electives in departments that prepare them to apply computer science to a particular field of interest. Majors in Computational Mathematics may substitute MATH 2001 for CISC 2210 as a prerequisite for CIS courses.

Warning: Since many Mathematics and some CIS courses (e.g., CISC 3820), are offered no more than once a year or even two, students majoring in Computational Mathematics should plan their schedules accordingly.

III. ANSWERS TO COMMON QUESTIONS ABOUT CIS



I've heard a lot of conflicting opinions about the job and career prospects in computing. I need to know accurate information. Are jobs available, and does computing make sense as a lifetime career? Where can I learn more about this subject?

Yes, there are jobs available in computing. Even when the number of jobs in the field was at its lowest point in 2002-03, there was less unemployment in the Information Technology sector than in the overall U.S. economy. Today, there is increasing demand for computing professionals, and a significant shortage of skilled personnel. Thus there is great opportunity for our graduates. Many people who start out in IT jobs move into managerial positions in their organizations. The key to any successful career, including a computing career, is keeping up with the field and continuing education throughout your working years. An excellent source for information about computing careers is at <http://computingcareers.acm.org>. Look at the Frequently Asked Questions on that site for detailed answers to many of your questions about the computing job and career situation.



interested in STEM fields (Science, Technology, Engineering, and Mathematic) The standard version of CISC 1110 is not geared to a particular application area, but rather uses examples from a variety of fields. You may take whichever version of CISC 1110 appeals to you.

What are those other introductory courses?

The department offers two other introductory courses, but they are not appropriate first courses for a CIS major. They are:

- CISC 1000, Computing: Its Nature, Power and Limits
- CISC 1050, Introduction to Computer Applications.

CISC 1000 is designed for students who do not intend to major in CIS or in the sciences. CISC 1050, which can be taken by a CIS major, teaches office applications like Windows, Word, Excel, Access, and Powerpoint.

Students can take CISC 1050 in the same semester as CISC 1110.

Is CISC 1110 an easy course?

No, the student should expect substantial programming assignments requiring a good deal of time. In addition to the hours spent in class, at least 10 to 12 hours per week will be needed to run programs on the computers in the college's computer center (or at home). Programming can only be learned by writing programs, and this is a painstaking, time-consuming task requiring intellectual rigor and discipline. We want the student to achieve a good understanding of the nature of programming before deciding to make a lifetime career out of working with computers.



Which introductory course should the student who intends to major in CIS take?

A student who intends to major in CIS should start by taking CISC 1110, Introduction to Computing Using C++.

CISC 1110 is an introduction to programming, using the C++ programming language. The programming assignments do not assume that the student has a mathematical background beyond high school mathematics. The C++ language is used heavily in later courses in the curriculum, as well as in industry.

There are currently two versions of CISC 1110. One section emphasizes scientific applications, and is intended for students

Do I need to know much mathematics in order to take CISC 1110?

No, not much in the way of college level courses is necessary for CISC 1110. However, the student should have done well in high school mathematics and other introductory courses.

What course should I take first if I have had an introductory computing course at some other college?

If you have taken an approved introductory programming course, but in some language other than C or C++, you should initially take CISC 1180, Introduction to C++ for Programmers. This course presumes a general knowledge of programming in some language other than C or C++. Typically, this other language would be Pascal, Java, or Visual BASIC.



Since the demand for CISC 1180 is low, students registering for the course are advised to sit in on any section of CISC 1110 and do all the assignments and exams for a grade. If you are in doubt about whether the introductory course you took is acceptable, you should speak to a department counselor. Briefly, to take a course beyond CISC 1110 or 1180, you should be comfortable with such programming concepts as nested loops, functions and parameter transmission, arrays, simple searching and sorting techniques, logical and relational operators, and other control structures.

In all cases, if you have had a first course elsewhere, you should speak with a counselor in planning the rest of your program as a CIS major. You should seek guidance prior to the registration period.

What other first steps should the prospective CIS major take?

Move ahead on satisfying the mathematics requirements. Take MATH 1201 as soon as possible. See a counselor in the Department of Mathematics with regard to any prerequisite courses that must be completed before taking MATH 1201. Many



students will have to take MATH 1011 before MATH 1201.

How do I declare myself a CIS major?

During your sophomore or junior year, you will be asked to declare a major. Students who wish to declare themselves as CIS majors should do so through the Brooklyn College WebCentral portal, <http://www.portal.brooklyn.edu>. Day students wishing to consult an advisor should see Prof. Moshe Augenstein (2122N, 951-5000 x2041, augenstein@sci.brooklyn.cuny.edu). Evening or weekend students should see Prof. Joseph Thurm (2109N, 951-5657; thurm@sci.brooklyn.cuny.edu). Their office hours are posted outside the department office, room 2109N.

If you have not yet taken CISC 1110 or 1180, but wish to major in CIS, defer your major declaration and take one of these courses as soon as possible.

What second course(s) should be taken by a CIS major?

CISC 2210 (Introduction to Discrete Structures) and CISC 3110 (Advanced Programming Techniques) are good second courses. CISC 3110 continues the study of C++ programming and also introduces the student to the study of data structures. This course includes substantial programming assignments. CISC 2210 covers some of the mathematical and logical constructs that underlie computing. CISC 2210 has a prerequisite of MATH 1011 or placement into MATH 1201 by the Math Department.



Can an undergraduate student take a graduate course?

Advanced (senior year) students with good records can consider taking a CIS graduate course as an advanced elective, if they satisfy the prerequisite conditions. This requires the approval of both the department and the Academic Advisement Center. See the Graduate Student Counselor. A large variety of graduate courses are offered every semester, including courses in artificial intelligence, databases, and computer networks.

Will I learn about UNIX?

Yes. CISC 3110 is usually taught under UNIX on Sun workstations. Several other courses in the department are taught using UNIX. CISC 1150 and CISC 3350 teach UNIX and workstation programming.



Where can I learn Java and object-oriented programming?

CISC 3120 teaches object-oriented programming using Java.

How can I learn other programming languages besides C++ and Java?

You may take CISC 3160 which includes an introduction to other languages. You may also take a CIS course numbered between 1150 and 1200 to learn a specific new language.

Is there any opportunity to do research at the undergraduate level?

Yes. There are a number of laboratories in the CIS department where faculty have ongoing research projects. Students can do independent work with these faculty and receive credit for CISC 4900, 4905, or 5001; superior students may apply for honors credit in any CIS course, enroll in the honors courses CISC 4940 to 4955, or enroll in one of the supervised research project courses, CISC 5001 to 5004. These projects offer students the opportunity to get involved in hands-on practical work with both hardware and software. The projects can provide you with skills and contacts which can enhance your career opportunities or your choice of graduate schools. Getting involved in research is especially important for those students who want to continue on to graduate school in computer science. It is a good idea to start looking into a project early in your CIS career. Talk to your professors about their work, or contact professors who are doing work consistent with your interests.



How should I prepare myself for graduate school in computer science?

A student intending to go to graduate school in computer science should take CISC 3220, CISC 3390, and CISC 3230. It is also a good idea to take as many CIS electives as possible, and to do a research project with a CIS faculty member for CISC 4900, 4940, 4945, 4950, 4955, 5001 or 5002. If you plan to take the Graduate Record Exam in computer science, you should complete CISC 3230 before taking the exam.

Who should consider entering a computer-related profession?

A principal criterion, of course, for anyone considering working with computers is interest--either in the computer per se, or in the enormous variety of applications to which it is put. Apart from this, however, people's programming abilities vary enormously.



It is sometimes said that the person who enjoys the challenge of solving puzzles and who can attack a complex problem in an orderly, disciplined fashion--even if he or she knows little formal mathematics--may do well in programming. The importance of being intellectually disciplined is paramount, for in dealing with machines nothing useful can be achieved by vague or fuzzy thinking. It is also necessary to be willing to do extremely painstaking and detailed work. Very lengthy procedures must be stated with complete precision. Because of the increasing competition within the cadre of people working with computers, the person who is slow and not incisive in handling computer-related tasks will not fare well.

It is not necessary to have extensive mathematical knowledge for most professional programmer jobs, and many have entered the field with undergraduate majors in such diverse areas as psychology, history, English literature, etc. It seems likely, however, that in the future most professional programmers will be graduates of computer science programs. It is often true that people with mathematical

interests will have an interest in computing, but this is neither a necessary nor a sufficient ingredient to do well in a computing job.

Do I need a grade of C or better in every single CIS course to complete the major?

No. You need a grade of C or better in 24 advanced elective credits at Brooklyn College for the B.S. in Computer and Information Science. All courses not marked with an asterisk in Section IV or in the Bulletin are advanced electives. You need a C or better in any course that is a prerequisite to any other CIS course. For example, you need a C in CISC 3130, since it is a prerequisite for CISC 3120, but you do not need a C or better in CISC 3180 (because it is not a prerequisite for anything), as long as you have 24 other advanced electives with a grade of C or better.

See the Mathematics department about grade requirements for mathematics courses.

I've heard that the department is changing the primary teaching language from C++ to Java. How will this affect me?

It won't affect you at all as long as you take the CISC 1110, 3110, 3120 and 3130 courses in the correct sequence, one in each term. If you delay a term, fail, or drop a course, you may have a problem.

When are these courses offered for the last time?

CISC 1110 will be offered for the last time in Summer 2017. CISC 3110 will be offered for the last time in Fall 2017. CISC 3120 will be offered for the last time in Spring 2018. CISC 3130 in C++ will be offered for the last time in Spring 2018.

Thus it is essential that students who have taken CISC 1110 already or are taking CISC 1110 in Spring or Summer 2017 semester, follow up with 3110, 3120 and 3130 according to the above schedule.

I've failed CISC 1110 and it is not offered again. What should I do?

You will have to take CISC 1115 in Java or CISC 1070 (with permission of the Chair) and switch to the new Java sequence of courses. See a CIS department advisor.

I have not completed the CISC 1110, 3110, 3130 sequence or CISC 3120 while the courses are still offered in C++. What should I do?

The department is changing the primary teaching language from C++ to Java in Fall, 2017. CISC 1110 will be offered for the last time in Summer, 2017. After that, the If you have missed your chance to complete the program in C++, see a CIS department advisor about how to proceed.

If I fail CISC 1110 or 3110 and it is no longer offered, can I get F replacement by taking the corresponding Java course (1115 or 3115)? What about 3130?

No, unfortunately you can't get F replacement for 1110 or 3110. The new courses are different courses with different course numbers and content. You can, however, get F replacement for CISC 3130 even if it has switched from C++ to Java, because it has the same course number and is considered the same class.

IV. COURSES OFFERED BY THE CIS DEPARTMENT



CISC courses numbered 2000 and above, taken at Brooklyn College, count towards the B.S. requirement of 24 credits in advanced courses. Descriptions of courses can be found in the [Undergraduate Bulletin](#). A list matching new and old course numbers can be found at

http://www.brooklyn.cuny.edu/courses/new_crs_num.jsp

The Schedule of Classes published each term lists courses offered in that particular semester. Not all courses are offered each term.

The first digit of a course number indicates its general level of difficulty:

- 1000 Introductory Courses
- 2000 Lower-Intermediate Courses
- 3000 Upper-Intermediate Courses
- 4000 Specialized Courses
- 5000 Honors/Research Courses

The hundred's digit indicates the area of Computer Science it addresses:

- 000 Service
- 100 Programming
- 200 Theory
- 300 Hardware/Software Systems
- 400 Intelligent Systems
- 500 Information Systems
- 600 Multimedia
- 800 Other Topics

***1000 Computing: Its Nature, Power and Limits**

(3 hours; 3 credits)

Not open to students who are enrolled in, or have completed, any CIS course--other than CISC 1050--with a C or higher, or who have completed CORC 1312 or Core Studies 5 or 5.1.

***1001 Computing and Quantitative Reasoning**

(3 hours; 3 credits)

***1002 The Outer Limits of Reasoning**

(3 hours; 3 credits)

Not open to students who are enrolled in or have completed CORC 3310

***1003 Exploring Robotics**

(3 hours; 3 credits)

Not open to students who are enrolled in or have completed CORC 3303

***1030 The Internet**

(2 hours lecture, 2 hours lab; 3 credits)

Prerequisite: CORC 1312 or Core Studies 5 or 5.1 or any course in computing.

Not open to students who have completed CIS 13 or higher.

***1035 Multimedia Production for the World Wide Web**

(1 hour recitation, 1 hour lecture; 2 hours lab; a minimum of 4 hours independent computer laboratory work : 3 credits)

Prerequisite: CORC 1312 or Core Studies 5 or 5.1 or any course in computing.

Not open to students who are enrolled in or have completed CISC 3800 or 3630.

***1050 Introduction to Computer Applications**

(3 hours; 3 credits)

Not open to students who are enrolled in or have completed CISC 3800.

***1060, *1062 Computing Workshop 1, 2**

(10 hours; 3 credits)

Prerequisite: CORC 1312 or 3303, or Core Studies 5 or 5.1, or any course in CIS; and permission of the chairperson.

***1070, *1072 Special Topics in Computing**

(3 hours; 3 credits)

Prerequisite: varies with each topic offered.

***1110 Introduction to Computing Using C++**

(3 hours lecture, 2 hours lab; 4 credits)

Not open to students who are enrolled in or have completed CIS 1.10 or 1.20 or 16 or CISC 1180 or 3110.

***1115 Introduction to Computing Using Java**

(3 hours lecture, 2 hours lab; 4 credits)

Not open to students who are enrolled in or have completed CIS 1110 (1.5).

***1150 UNIX Shell Programming**

(2 hours; 2 credits)

Prerequisite: CISC 1170 or 3110 or 3115.

***1155 Programming in Perl**

(2 hours; 2 credits)

Prerequisite: CISC 3130.

***1160 Visual Programming and Windowing**

Applications

(2 hours; 2 credits)

Prerequisite: CISC 3130

***1170 Java for Programmers**

(2 hours; 2 credits)

Prerequisite: an introductory programming course in a language other than Java, and permission of the chair

Not open to students who are enrolled in or have completed CIS 1115 or 3115.

***1180 Introduction to C++ for Programmers**

(2 hours; 2 credits)

Prerequisite: An introductory programming course in a language other than C++ or C.

Not open to students who are enrolled in or have completed CISC 1110 or 3110.

***1341 Assembly Language Programming for Microcomputers [INACTIVE]**

(3 hours; 3 credits)

Prerequisite: CIS 1.10 or 1.20 or 2.40 or CISC 1110 or 1115 or 1180.

***1400 Elementary Robotics**

(3 hours; 3 credits)

Prerequisite: CORC 1311 or MATH 1011 or 1026 or 1201 or permission of the chairperson.

***1410 Philosophy and Artificial Intelligence**

(3 hours; 3 credits)

Prerequisite: CORC 1312 or Core Studies 5 or 5.1 or a course in CIS; and CORC 1210 or Core Studies 10 or a course in philosophy; or permission of the chairperson.

Not open to students who have completed CIS 32.1.

***1530 Electronic Commerce**

(3 hours; 3 credits)

Prerequisite: CORC 1312 or Core Studies 5 or 5.1 or any course in computing.

***1580W Seminar in Computer-Assisted Management Games**

Prerequisite: ENGL 1012.

Prerequisite or corequisite: BUSN 3400 or MATH 2501 or 3501; and BUSN 3430 or CISC 2531; and CISC 1050 or 1110; and senior standing; and at least 34 credits in CIS and/or Business courses required for the B.S. degree in CIS or the B.S. degree in business, management, and finance.

Not open to students who have completed Economics 80.3.

***1590 Management Information Systems**

(3 hours; 3 credits)

Prerequisite: CISC 1050 and at least sophomore standing or permission of the chairperson..

Not open to students who have completed BUSN 3420.

***1595 Management of New and Emerging Technologies**

(3 hours; 3 credits)

Prerequisite: CISC 1050 or permission of the chairperson.

Not open to students who have completed Economics 50.8

***1597 New Media and Business**

(3 hours; 3 credits)

Prerequisite: sophomore status or departmental permission.

***1600 Introduction to Multimedia Computing**

(3 hours; 3 credits)

2210 Introduction to Discrete Structures

(3 hours; 3 credits)

Prerequisite: CIS 1.10 or 1.20 or 1110 or 1115; and MATH 1011 or 2.92 or assignment to MATH 3.20 or 1201 or 4.10 by the Department of Mathematics.

2531 Operations Management

(3 hours; 3 credits)

Prerequisites: CORC 1312 or Core Studies 5.1 or CIS 100 or 1050 or 1110 or 1115; CISC 2210 or BUSN 3400 or ECON 3400 or MATH 2501 or MATH 3501. Not open to students who are enrolled in or have completed MATH 3606 or Economics 31.4.

2532 Information Systems Project Management

(3 hours; 3 credits)

Prerequisites: CISC 1590 or BUSN 3420.

2590 Foundations of Business Analytics

(3 hours; 3 credits)

Prerequisites: BUSN 3400, ECON 3400, MATH 1501, PSYC 3400, or an equivalent statistics course with a grade of C or better; and CISC 1050 or proficiency with spreadsheets.

2810W Macromolecular Structure and Bioinformatics

(3 hours; 3 credits)

Prerequisites: English 1012, Biology 1001, Biology 1002, and permission of the instructor.

2820W Computers and Ethics

(3 hours; 3 credits)

Prerequisite: CORC 1312 or Core Studies 5.1 or CIS 1000 or 1110 or 1115, and ENGL 1012.

2830 Introduction to Natural Language Processing

(3 hours; 3 credits)

Prerequisite: CISC 1110 or 1115

Prerequisite or corequisite: CISC 2210 and Linguistics (LING) 2001.

3110 Advanced Programming Techniques

(4 hours; 4 credits)

Prerequisite: CISC 1110 or 1180.

Not open to students who are enrolled in or have completed CISC 3130.

3115 Introduction to Modern Programming Techniques

(4 hours; 4 credits)

Prerequisite: CISC 1115 or 1170.

Not open to students who are enrolled in or have completed CISC 3110.

3120 Design and Implementation of Software Applications 1

(3 hours; 3 credits)

Prerequisite: CISC 3110.

3130 Data Structures

(4 hours; 4 credits)

Prerequisite: CISC 3115; or CISC 3110 and 1170.

3140 Design and Implementation of Large-Scale Web Applications

(3 hours; 3 credits)

Prerequisite: CISC 3130; and either 3115 or 3120.

3142 Programming Paradigms in C++

(3 hours; 3 credits)

Prerequisite: CISC 3115, 3130, and either 3310 or permission of the chair.

Not open to students who have completed CISC 3110.

3150 Object-Oriented Programming

(3 hours; 3 credits)

Prerequisite: CISC 3120 and 3130.

3160 Programming Languages

(4 hours; 4 credits)

Prerequisite: CISC 3142 or 3150.

3171 Introduction to Software Engineering

(3 hours; 3 credits)

Prerequisite: CISC 3130.

3220 Analysis of Algorithms

(3 hours; 3 credits)

Prerequisite: CISC 2210; CIS 21 or CISC 3130; MATH 3.20 or 1201 or 4.10.

3230 Theoretical Computer Science

(3 hours; 3 credits)

Prerequisite: CISC 2210; CIS 21 or CISC 3130; MATH 3.20 or 1201 or 4.10.

3240 Cryptography and Cryptanalysis

(3 hours; 3 credits)

Prerequisite: MATH 2101 or permission of the chair.

3305 Computer Organization [INACTIVE]

(3 hours; 3 credits)

Prerequisite: CIS 4 or CISC 1341; and CISC 2210.

Not open to students who are enrolled in or who have completed CISC 3315.

3310 Principles of Computer Architecture

(4 hours; 4 credits)

Prerequisite: CISC 1110 or 1115 or 1170 or 1180; and CISC 2210.

Not open to students who are enrolled in or have completed CISC 3305 or 3315.

3315 Digital Computer Systems

(3 hours lecture, 3 hours laboratory; 4½ credits)

Prerequisite: CIS 4 or CISC 1341; and CISC 2210.

Not open to students who are enrolled in or have completed CISC 3305.

3320 Operating Systems

(3 hours; 3 credits)

Prerequisite: CIS 21 or CISC 3130; and CISC 3305, 3310, or 3315. Recommendation: experience on two platforms.

3325 Information Security

(3 hours; 3 credits)

Prerequisite: CIS 3320

3330 Foundations of Parallel and Distributed

Computing

(3 hours; 3 credits)

Prerequisite: CISC 3142; or permission of the chairperson.

3340 Computer Networks and Protocols

(3 hours; 3 credits)

Prerequisite: CISC 3130; CISC 3305, 3310, or 3315; and MATH 2501.

Not open to students who are enrolled in or have completed CISC 3343 or 3345.

3343 Telecommunications

(3 hours; 3 credits)

Prerequisite: CISC 3130; CISC 3305, 3310, or 3315; and MATH 2501.

Not open to students who are taking or have taken CISC 3340.

3345 Computer Networks

(3 hours; 3 credits)

Prerequisite: CISC 3130; CISC 3305, 3310, or 3315.

Not open to students who are taking or have taken CISC 3340.

3350 Workstation Programming

(3 hours; 3 credits)

Prerequisite: CISC 3130.

3390 Compiler Construction

(3 hours; 3 credits)

Prerequisite: one of CIS 2.10, 2.20, 2.30, 2.40, 2.85, CISC 1150, 1170 or 3150; CISC 2210 and 3130.

3410 Artificial Intelligence

(3 hours; 3 credits)

Prerequisite: CIS 21 or CISC 3130.

3415 Principles of Robotics

(3 hours; 3 credits)

Prerequisite: CISC 2210 and CISC 3130.

3610 Introduction to Multimedia Programming

(3 hours; 3 credits)

Prerequisite: CISC 3110 or 3115.

3620 Computer Graphics

(3 hours; 3 credits)

Prerequisite: CISC 3130 and MATH 1011 or 1026 or assignment to MATH 1201.

3630 Multimedia Computing

(3 hours; 3 credits)

Prerequisite: CISC 1030 or 1050; and CISC 3800 or 3130.

3650 Human-Computer Interaction

4920 Programming Practicum

(3 hours; 3 credits)

Prerequisite: CISC 3115 or 3120.

3660 Game Programming

(3 hours; 3 credits)

Prerequisite: CISC 3130.

3665 Game Design

(3 hours; 3 credits)

Prerequisite: CISC 3130, and MATH 1011 or 1201.

3800 Advanced Personal Computer Techniques for Business Applications

(3 hours; 3 credits)

Prerequisite: CISC 1110 or 1115 and CISC 1050, or permission of the chairperson.

3810 Database Systems

(3 hours; 3 credits)

Prerequisite: CIS 21 or CISC 3130; and CISC 1050 or permission of the chairperson.

3820 Introduction to Modeling and Simulation

(3 hours; 3 credits)

Prerequisite: CISC 1110; and MATH 3501.

4331 System and Network Administration

(2 hours lecture; 2 hours lab; 3 credits)

Prerequisite: CISC 3320 or 3350 or permission of the chairperson.

4335 Parallel and Distributed Computing

(3 hours; 3 credits)

Prerequisite: CISC 3130; CISC 3305, 3310, or 3315 or permission of the chairperson; and one of CISC 1150, 1170, 3160, 3320, 3150, 3410, 3350, 3330, 3820.

4610 Multimedia Databases

(3 hours; 3 credits)

Prerequisite: CISC 3810, CISC 3635 or 3630.

4800 Special Topics in Computer Science

(3 hours; 3 credits)

Prerequisite: CIS 21 or CISC 3130; and permission of the chairperson.

4900, 4905 Independent and Group Projects I, II

(3 hours recitation and at least 6 hours independent work; 3 credits each term)

Prerequisite of 4900: CISC 3110 or 3115 and permission of the chairperson.

Prerequisite of 4905: CISC 4900 and permission of the chairperson.

(1 hour lecture, 2 hours lab; 2 credits)

Prerequisite: CISC 3130.
Pre- or co-requisite: CISC 3220

4930, 4935 Advanced Computing Topics

(3 hours; 3 credits)

Prerequisite: Dependent on course topic.

4940, 4945 Seminar in Theoretical Aspects of Information Science I, II

(3 hours recitation and a minimum of 7 hours conference and independent work; 3 credits each term)

Prerequisite: see next page.

4950, 4955 Seminar in Special Topics I, II

(3 hours recitation and a minimum of 7 hours conference and independent work; 3 credits each term)
Prerequisite: see next page.

5001, 5002, 5003, 5004 Independent Study and Research I, II, III, IV

(Minimum of 9 hours conference and independent work; 3 credits each term)

Prerequisite: CISC 3130, an advanced elective in CIS numbered 3140 or above, a minimum GPA of 3.0 overall in CIS advanced electives, a declared major in the CIS department and permission of the chairperson.

Honors at Graduation



In order to receive departmental honors at graduation, a student must be recommended by the department, must have an index of at least 3.50, and must have completed either an honors course or an honors project. Although it is necessary to take an honors course or project to receive honors at graduation, honors are not guaranteed. The department must vote to award departmental honors. If awarded, departmental honors appears as a notation on your diploma.

Honors Courses

Students with superior records and the recommendation of a department faculty member may apply to the chairperson for permission to register for courses described below. Students may not register for more than six credits in honors courses in the department in one term.

4940, 4945 Seminar in Theoretical Aspects of Information Science I, II

(3 hours recitation and a minimum of 7 hours conference and independent work; 3 credits each term)

Prerequisite of 4940: a superior record, including an approved program of advanced courses, and recommendation of a department faculty member and permission of the chairperson.

Prerequisite of 4945: CISC 4940 and permission of the chairperson.

4950, 4955 Seminar in Special Topics I, II

(3 hours recitation and a minimum of 7 hours conference and independent work; 3 credits each term)

Prerequisite of 4950: a superior record, including an approved program of advanced courses, and recommendation of a faculty member and permission of the chairperson. Prerequisite of 4955: CISC 4950 and permission of the chairperson.

5001, 5002, 5003, 5004 Independent Study and Research I, II, III, IV

(Minimum of 9 hours conference and independent work; 3 credits each term)

Prerequisite: CISC 3130, an advanced elective in CIS numbered 23 or above, a minimum GPA of 3.0 overall in CIS advanced electives, a declared major in the CIS department and permission of the chairperson.

Honors Projects

A student with a 3.0 index or better may arrange to do an honors project in a CIS course he or she is taking. In the rare case where the project is undertaken with a professor different from the instructor of the course, coordination should be arranged between the professor teaching the course and the professor supervising the research project. A student who successfully completes an honors project and receives an A or B in the associated course will receive honors in the course. Completing a course with honors is indicated on the student's transcript.

V. COMPUTER AND LIBRARY FACILITIES



CIS undergraduate students have access to computer facilities at Brooklyn College and limited access to the facilities at the City University Computer Center (CUNY/UCC).

CUNY Computer Facilities

CUNY/UCC serves as the central computer facility for all units of the City University of New York. CUNY/UCC is connected to many university centers around the world via the Internet. CUNY/UCC has several mainframe computers.

Brooklyn College Computer Facilities

Computer Labs

The ITS Public Computing Labs now feature 250 new computers—including SUN workstations, PCs, and Apple MACs—in an inviting open work space. Nearby are lounge areas, study rooms, computer classrooms, tutoring areas, and a videoconference room. Special services include scanning, DVD writing, and express printing. The lab has been specially designed acoustically to make for a quiet facility.

Computer accounts are automatically assigned to students enrolled in classes which require them. Students who need computer accounts for other purposes should ask at the front desk of the ITS Public Computing Facility.

Other Computer Facilities

The CIS Department maintains an Ethernet-based network of computers for use by its faculty and other researchers. The network is an Internet node. Many departments have computer-based courses. To meet the demand for computers, there are many computer labs distributed around the campus, especially in the library. There is an Internet Café in Whitehead Hall that is open 24 hours per day.

Brooklyn College Library

The Brooklyn College Library has numerous computers, and it also maintains the Internet Café in Whitehead Hall. There is a New Media Center on the second floor. The library has numerous computer science journals available online. See "Quick Tips for Computer and Information Science Research in the Brooklyn College" at this URL:
http://www.brooklyn.cuny.edu/pub/departments/cis/CIS_Research_in_BC_Library.pdf

Internet Resources

The CIS Department's Web page, <http://www.brooklyn.cuny.edu/pub/departments/cis/>, contains information about department programs, as well as links to the Web pages of various CIS faculty members.

News and Announcements



The CIS Department Web site has a News and Announcements page at

http://www.brooklyn.cuny.edu/pub/departments/cis/cis_news.htm

This page contains announcements, class cancellations, room changes, and other items.

Check the page to find out what's going on.

The CISTalk List

There is a CIS email list, called CISTalk. The purpose of this list is to provide a way for CIS faculty to send to students and other faculty information on jobs, internships, and other articles of interest. Messages sent to the list are distributed via email to all subscribers to the list. The list is free, and all CIS students are encouraged to subscribe. Students may not post to the list due to abuses of the list in the past.

To subscribe to the list, unsubscribe from the list, or to access an archive of past postings to the list, go to this page:

<http://www.sci.brooklyn.cuny.edu/cistalk/>

VI. STUDENT SOCIETIES

The Computer Science Society

The Computer Science Society is a school club, composed of students interested in the field of computing. Students with such an interest are invited to join, regardless of their intention to major in computer and information science.



The main activities of the Computer Science Society include the following: talks by guest speakers, club and social meetings, and access to special society offers.

For more information about the Computer Science Society, contact its officers by leaving a note in the society's mailbox in Room 2109N, or contact one of the faculty advisors, Prof. Danny Kopec or Prof. Murray Gross.

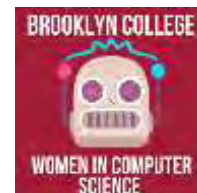
Upsilon Pi Epsilon Honor Society



Brooklyn College has a chapter of the national Computer Science Honor Society, Upsilon Pi Epsilon (UPE). Students are elected to membership in this society in their junior or senior year, based on their academic record. More information about the society and election procedures can be found on the bulletin boards outside the department office.

Women in Computer Science

The Women in Computer Science Club strives to build a strong and supportive community for women in a field where they are largely underrepresented. Through events, technical workshops, and resource sharing, we are making Brooklyn College a place where women are encouraged to pursue a career in technology. Now at over 40 members and growing, the club is constantly looking for opportunities to expand their efforts. For information and inquiries, please e-mail bcwomenincompsci@gmail.com.



VII. FACULTY AND STAFF

FULL-TIME FACULTY



David Arnow



Distributed programming;
simulation of physical systems;
computer science education.

arnow@sci.brooklyn.cuny.edu

1216N 951-5000 x2040

Moshe Augenstein



Data structures; program efficiency;
software engineering;
microcomputers.

augenstein@sci.brooklyn.cuny.edu

2122aN 951-5000 x2041

Amotz Bar-Noy



Design and analysis of algorithms;
theoretical aspects of communication
networks.

amotz@sci.brooklyn.cuny.edu

2112aN 951-5000 x2042

Hui Chen



Mobile wireless networks, wireless
sensor networks, system and network
security, software engineering,
probabilistic modeling and simulation.

chen@sci.brooklyn.cuny.edu

1432N 951-2055

Eva Cogan



Intelligent agents; logic; multiagent systems.

cogan@sci.brooklyn.cuny.edu
2112bN 951-5000 x2046

James Cox



Sensory-based robotics; medical imaging; combinatorial algorithms and computational complexity theory.

cox@sci.brooklyn.cuny.edu
2112cN 951-5000 x2047

Scott Dexter



Network security; formal methods.

dexter@sci.brooklyn.cuny.edu
0113N 951-5000 x2048

Tzipora Halevi



Security, privacy, human-computer interaction, embedded systems, Internet of things, signal processing.

halevi@sci.brooklyn.cuny.edu
2156aN 951-1517

Jacqueline Jones



Operating systems; hardware;
programming languages, music and
computers.

jones@sci.brooklyn.cuny.edu
2218N 951-5000 x2054

Devorah Kletenik



Algorithms; Boolean functions;
machine learning/computational
learning theory.

kletenik@sci.brooklyn.cuny.edu
5316N 951-5000 x1502

Yedidiah Langsam



Multimedia; medical informatics; data
structures; personal computing and
the Internet.

langsam@sci.brooklyn.cuny.edu
2109N 951-5657

Rivka Levitan



Natural language processing;
spoken language processing;
dialogue systems; prosody and
discourse.

levitan@sci.brooklyn.cuny.edu
3114N 951-5000 x3997

Michael Mandel



Signal processing; machine learning;
audio processing; noise robust
automatic speech recognition;
psychoacoustics.

mim@sci.brooklyn.cuny.edu
2232N 951-5000 x2053

Rohit Parikh



Applications of logic to AI; logic and
semantics of programs; formal
languages; proof theory.

rparikh@gc.cuny.edu
1161N 951-5000 x2058

Theodore Raphan



Modeling and simulation of eye
movement control orientation; data
acquisition and analysis; mechanisms;
models of spatial pattern recognition
and computer vision; neural networks;
artificial intelligence.

raphan@nsi.brooklyn.cuny.edu
541NE 951-4193

Ira Rudowsky



Database design, analysis and
implementation; multimedia databases
intelligent agents.

rudowsky@brooklyn.cuny.edu
1417N 951-5000 x2062

Charles Schnabolk



Formal development of programs;
programming languages.

CSchnabo@brooklyn.cuny.edu
2118N 951-5000 x 2064

Dina Sokol



Algorithm design and analysis; pattern
matching algorithms; computational
biology; data compression.

sokol@sci.brooklyn.cuny.edu
3209dN 951-5000 x2065

Aaron Tenenbaum



Data structures and algorithms;
programming languages and
compilers.

tbaum@sci.brooklyn.cuny.edu
2122bN 951-5000 x2066

Joseph Thurm



Database management practical uses
of computers in business.

thurm@sci.brooklyn.cuny.edu
2109N 951-5657

Gerald Weiss



Object-oriented software development and patterns; programming languages and compilers; operating systems and constraint solving and programming; distributed programming.

weiss@sci.brooklyn.cuny.edu
143NE 951-5000 x2664

Paula Whitlock



Programming languages and compilers. Computer simulations, especially Monte Carlo methods; development of random number generators, especially for parallel computing systems.

whitlock@sci.brooklyn.cuny.edu
1212N 951-5000 x2069

Noson Yanofsky



Category theory. Complexity theory. Higher-dimensional algebra.

yanofsky@sci.brooklyn.cuny.edu
1430N 951-5000 x2070

Gavriel Yarmish



Distributed and parallel optimization methods; optimization of large linear optimization programs.

yarmish@sci.brooklyn.cuny.edu
1214N 951-5000 x2071

Neng-Fa Zhou



Programming languages abstract
machines and compilers constraint
solving and programming Web
publishing.

zhou@sci.brooklyn.cuny.edu
1161N 951-5000 x2073

Chaim Ziegler

No photo available

Multimedia systems; computer
networks; queueing theory; computer
and Internet telephony systems.

ziegler@sci.brooklyn.cuny.edu
1233N 951-5000 x2074



ADJUNCT AND PART-TIME FACULTY

Colven Benjamin	benjamin@brooklyn.cuny.edu	Soumi Maiti	soumimaititithi@gmail.com
Farhan Bukhari	bukharifarhan@gmail.com	Ari Mermelstein	
John Connor	connor@sci.brooklyn.cuny.edu		mermelstein@sci.brooklyn.cuny.edu
Devorah Elefant	elefant@sci.brooklyn.cuny.edu	Adele Piontnica	adele@sci.brooklyn.cuny.edu
Nechama Ettinger	ettingr8@aol.com	Aalia Rafique	rafique@sci.brooklyn.cuny.edu
	ettinger@sci.brooklyn.cuny.edu	Ezra Rhein	rhein@sci.brooklyn.cuny.edu
Lilly Fertig	lilly_fertig@yahoo.com		ProfRhein@gmail.com
	fertig@sci.brooklyn.cuny.edu	Danielle Safonte	danielle.safonte@gmail.com
Lawrence Goetz	goetz@sci.brooklyn.cuny.edu	Linda Sobieski	lyndaS@sci.brooklyn.cuny.edu
Harry Goldberg	Harry.s.goldberg.nyc@gmail.com	Alex Sverdlov	alex@theparticle.com
Murray Gross	magross@its.brooklyn.cuny.edu		sverdlov@sci.brooklyn.cuny.edu
Jonathan Hanon	jonhanon@sci.brooklyn.cuny.edu	Ali Syed	Asyed2@gradcenter.cuny.edu
Denys Katerenchuk		Andreas Weise	awaise@gradcenter.cuny.edu
	dkaterenchuk@gradcenter.cuny.edu	Yongqing Xiang	xiang@sci.brooklyn.cuny.edu
Hirohiko Kushida	kushida@sci.brooklyn.cuny.edu	Ze Ye	ye@sci.brooklyn.cuny.edu
Moshe Lowenthal	moshe.lowenthal@Cerner.com	Robert Zwick	ProfZwick@gmail.com
	lowenthal@sci.brooklyn.cuny.edu		

FACULTY FROM OTHER DEPARTMENTS

Taiwo Amoo - Finance and Business Management	tamoo@brooklyn.cuny.edu
Victoire Denoyel Garnier – Finance & Business	Victoire.Denoyel@brooklyn.cuny.edu
Anna Gotlib - Philosophy	agotlib@brooklyn.cuny.edu
Stephen Lucci – City College	lucci@cs.ccny.cuny.edu
Heneith Samuel – Telecommunications	hsamuel@brooklyn.cuny.edu
Shaneen Singh - Biology	ssingh@brooklyn.cuny.edu
Pawel Walczuk – Business	pawel.walczuk@brooklyn.cuny.edu

DEPARTMENT STAFF

Johnathan Dixon	jdixon@sci.brooklyn.cuny.edu	951-5000 x1538
Lawrence Goetz,		
Network Administrator	goetz@sci.brooklyn.cuny.edu	951-5000 x2050
Elena Hintze	ehintze@brooklyn.cuny.edu	951-5657
Camille Martin	Cmartin@brooklyn.cuny.edu	951-5657
Bridget Sheridan	bsheridan@brooklyn.cuny.edu	951-5657