

Articulation Agreement with Borough of Manhattan Community College

Articulation Agreement Form

College of Agreement Initiation: City College of New York

A. SENDING AND RECEIVING INSTITUTIONS

Sending College: Borough of Manhattan Community College (BMCC)

Department: Science

Program: Biotechnology Science

Degree: AS

Receiving College: City College of New York (CCNY)

Division: Science

Program: Biotechnology

Degree: BS

Approved by Science Divisional Council

Sent to CLAS Faculty Council

BMCC contact for students: Dr. Joanna Giza (jgiza@bmcc.cuny.edu)

CCNY contact for students: Dr. Chris Li (cli@ccny.cuny.edu)

B. ADMISSIONS REQUIREMENTS FOR SENIOR COLLEGE PROGRAM

- 2.75 overall GPA and completion of AS in Biotechnology Science
- 3.0 minimum GPA in the science and mathematics courses from BMCC

Total transfer credits granted toward the baccalaureate degree: 60

Total additional credits required at the senior college to complete the baccalaureate degree: 60

C. COURSE TO COURSE EQUIVALENCIES AND TRANSFER CREDIT AWARDED

| Sending College | | Receiving College Equivalent | | Credits Granted |
|----------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|
| Course & Title | Credits | Course & Title | Credits | |
| General Education Requirements (18 cr) | | | | |
| ENG 101 English Composition | 3 | ENG 11000 Freshman Composition | 3 | 3 |
| ENG 201 Introduction to Literature | 3 | ENG 21001 Writing for the Humanities & Arts | 3 | 3 |
| World Cultures and Global Issues (elective course) | 3 | World Cultures and Global Issues (elective course) | 3 | 3 |
| US Experience in its Diversity (elective course) | 3 | US Experience in its Diversity (elective course) | 3 | 3 |
| Creative Expression SPE 100 Fundamentals of Public Speaking | 3 | SPCH 11100 Foundations of Speech Communication | 3 | 3 |
| Individual and Society (elective course) | 3 | Individual and Society (elective course) | 3 | 3 |
| Mathematics | 4 cr | Mathematics | | 4 cr |
| | | | | |
| MAT206 Precalculus | 4 | MATH 19500 Precalculus/ General elective credit from non-equivalent transfer credit | 3 1 | 3 1 |
| Biology | 12 cr | Biology | | 12 cr |
| BIO210 Biology I | 4 | BIO 10100 Biological Foundations I | 4 | 4 |
| BIO220 Biology II | 4 | BIO 10200 Biological Foundations II | 4 | 4 |
| BIO240 Genetics | 4 | BIO 20600 Introduction to Genetics | 4 | 4 |
| | | | | |
| Chemistry Courses | 18 cr | Chemistry | | 18 cr |
| CHE201 College Chemistry I | 4 | CHEM 10301: General Chemistry I | 4 | 4 |
| CHE202 College Chemistry II | 4 | CHEM 10401: General Chemistry II | 4 | 4 |
| CHE230 Organic Chemistry I | 5 | CHEM 26100: Organic Chemistry I CHEM 26200: Organic Chemistry Lab I | 3 2 | 5 |
| CHE 240 Organic Chemistry II | 5 | CHEM 26300: Organic Chemistry II CHEM 37400: Organic Chemistry Lab II General elective credit from non-equivalent transfer credit | 3 3 | 3 2 |
| Biotechnology Elective | | Biotechnology elective | | 3 |
| BTE201 Introduction to Biotechnology* | 5 cr | SCI 28000 Bioinformatics & Biomolecular Systems General elective credits from non-equivalent transfer credits | 3 | 3 2 |
| Unrestrictive electives | 3 cr | General Elective credits from non-equivalent transfer credits | | |
| Total Credits | 60 | | 60 | 60 |

D. CITY COLLEGE UPPER DIVISION COURSES REMAINING FOR BACCALAUREATE DEGREE IN BIOTECHNOLOGY

| Course & Title | Credits |
|---------------------------------------------------------------------------------------------------------------------|------------|
| General Education – College Option* | |
| Foreign Language Requirement | 0-3 |
| Major Courses | |
| Mathematics | |
| MATH 20500: Elements of Calculus | 4 |
| MATH 20900: Elements of Calculus & Statistics | 4 |
| Sciences | |
| BIO 22900: Cell & Molecular Biology | 4 |
| BIO 48300: Laboratory in Biotechnology | 5 |
| CHEM 32002 Biochemistry I | 3 |
| PHY 20300: General Physics I | 4 |
| PHY 20400: General Physics II | 4 |
| BIO 31000 or CHEM 31000 or PHY 31000 Independent Study (2 semesters) OR BIO/CHEM/PHY 30100/30200 Honors Research | 6 |
| Biotechnology electives (others acceptable as new courses are approved or if approved by Biotechnology advisor) | 11 |
| SCI 28000 Bioinformatics & Biomolecular Systems (3 cr) | |
| BIO 35000 Advanced Microbiology (4 cr) | |
| BIO 35200 Introduction to Immunology (3 cr) | |
| BIO 35400 Introduction to Neurobiology (3 cr) | |
| BIO 37500 Developmental Biology (3 cr) | |
| BIO 37900 Developmental Neurobiology (3 cr) | |
| BIO 37800 Science of Sex and Gender (3 cr) | |
| BIO 38000 Eukaryotic Genetics (3-4 cr) | |
| BIO 41000 Cell Development & Cellular Senescence (3 cr) | |
| BIO 42000 Virology (3 cr) | |
| BIO 42500 Cancer Biology (3 cr) | |
| BIO 48000 Topics in Microbial Genetics (3 cr) | |
| BIO 48100 Epigenetics (3 cr) | |
| CHEM 32004 Biochemistry I Lab (2 cr) | |
| CHEM 33000 Physical Chemistry I (4 cr) | |
| CHEM 33200 Physical Chemistry II (3 cr) | |
| CHEM 33500 Physical Biochemistry (5 cr) | |
| CHEM 37400 Organic Chemistry Laboratory II (3 cr) | |
| CHEM 40600 Environmental Chemistry (3 cr) | |
| CHEM 44000 Journey to the Center of the Cell (3 cr) | |
| CHEM 44200 RNA Biochemistry & Molecular Biology (3 cr) | |
| CHEM 48005 Biochemistry II (3 cr) | |
| PHYS 31500 Medical Physics (3 cr) | |
| PHYS 42200 Biophysics (3 cr) | |
| PHYS 42300 Biophysics in Applications (3 cr) | |
| PHYS 52200 Biomedical Physics (3 cr) | |
| Philosophy | |

| | |
|--------------------------|-------|
| PHIL 34905 Bioethics | 3 |
| | |
| General Electives | 12-15 |
| | |
| Total | 60 |

*3 credits of College Option are satisfied by SPE 100 taken at BMCC. Students who place out of the language requirement will have an additional 3 elective credits.

E. ARTICULATION AGREEMENT FOLLOW-UP PROCEDURES

1. Procedures for reviewing, up-dating, modifying or termination agreement.

The Borough of Manhattan Community College Biotechnology Option Curriculum Coordinator and City College Biotechnology Program Coordinator will review implementation of the agreement once every 2 years to ensure that students are adequately informed of the program and to identify issues requiring attention. In addition, the program will be reviewed whenever CUNY changes to general education requirements are modified.

2. Procedures for evaluating agreement.

The main objectives of the program evaluation are: (1) to document, interpret, and assess student, faculty, and institutional outcomes; (2) to compile evidence of how the program activities/components have led to student retention and degree attainment; and (3) to terminate the articulation agreement if the assessment measures indicate unsatisfactory performance.

In particular, the evaluation design will measure the extent to which program efforts are linked with measures of engagement and capacity, as well as the extent to which these measures are linked with student success measures (retention, credit accumulation, GPA, course success, and degree attainment). Engagement will be measured by survey data reflecting students' reported attitudes. Capacity will be measured by specific performance benchmarks, such as course passing incidences, credit accumulations, and grade point averages. It is expected that this systemic approach will result in increases in student enrollment, retention rates, and graduation rates.

a. Methods provide performance feedback/assessment of progress.

The evaluation design will include formal assessment at different points in time, with equal weight given to formative and summative evaluations. Formative evaluations will provide for mid-course corrections and on-going program improvement, based on programmatic feedback and interviews with faculty and student participants. Summative evaluations will occur at the end of each academic year to determine if specific objectives and benchmarks have been met.

b. Methods of evaluation include objective performance measures clearly related to intended outcomes and will produce quantitative & qualitative data to the extent possible.

The specific goals of this program are to increase student awareness in a new major and the opportunities in the work place after graduation. With active monitoring from faculty advisors, particularly by research mentors, we expect that student retention and completion within 6 years will be above the current overall City College graduation rate of 45.6%.

The City Academy for Professional Development (CCAAP) office will work in conjunction with the major advisor and be involved in the following assessments:

- 1) Student performance after transfer. Students who are doing poorly will be referred for tutoring.
- 2) Student retention.
- 3) Student graduation within 4 years after transfer to City College.
- 4) Student placement into biotechnology positions.

Some indicators and sources of evidence will be considered as follows:

Objective 1: Continuity

| Indicators | Sources of Evidence |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Curriculum and coursework integration | Faculty analysis and evaluation of student preparedness for upper-level courses at City College (transcript analysis and survey/interview review) |
| Curriculum Progression | Tracking record of student advisement sessions, student registration data, and transcript analysis |

Objective 2: Capacity

| Indicators | Sources of Evidence |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Knowledge and skill acquisition (basic and more advanced) | Test results, assignment grades, course pass rates |
| Overall academic performance | Grade point average, credit accumulation, retention, graduation |
| Attitudes – knowledge/skill acquisition, academic performance, and impact of/satisfaction with capacity-building efforts | Faculty, student, tutor interviews, surveys, focus groups |

If the success rate of the students transferring from Borough of Manhattan Community College to City College is below that of students who started their studies at City College, we will need to immediately assess the basis for the differing student performance. We will initially focus on the core courses from Borough of Manhattan Community College; the curriculum may need to be re-aligned, such that students cover the same material in similar amounts of depth between the two campuses. For courses that are giving students particular difficulty, City College CCAAP will monitor academic progress of transfer students in those courses more closely for earlier intervention, such as tutoring services. The goal is to ensure that both cohorts of students in the Biotechnology program, whether they are transfer students from Borough of Manhattan Community College or City College students, perform equally well in upper-level courses and are retained and graduate at similar rates.

3. Sending and receiving college procedures for publicizing agreement.

The new program and articulation agreement will be advertised on each respective college's websites. In addition, information about the program will be distributed by the Science Department at Borough of Manhattan Community College and by the Dean's Office in the Division of Science at City College for dissemination to students. All science advisors on both campuses will also be informed about the program.

G. ASSOCIATE IN BIOTECHNOLOGY FROM BOROUGH OF MANHATTAN COMMUNITY COLLEGE

City College General Education Requirements: 3

Remaining Core Requirements in Major: 45

City College Electives: 12

Total Credits to be earned at City College: 60

Total Credits to be earned at Borough of Manhattan Community College: 60

Total Credits required for the BS degree: 120