ARTICULATION AGREEMENT

between the computer science curricula at

Quinsigamond Community College
Dept. of Computer Science

and

University of Massachusetts Lowell
College of Sciences
Dept. of Computer Science

Winter 2015
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Purpose

This Agreement is intended to smooth the path for students transferring from the Quinsigamond Community College (QCC) Dept. of Computer Science to the University of Massachusetts Lowell (UMass Lowell) Dept. of Computer Science. It is not intended to override any rules, regulations, or admissions criteria of either institution. It is intended solely to clarify the intersections between the two curricula so that QCC students can adequately prepare themselves to enter the four-year Bachelor of Science (B.S.) in Computer Science program at UMass Lowell and complete that program successfully.

This Articulation agreement applies specifically to students who earn an Associate in Science (A.S.) degree in computer Science from QCC. Students who wish to transfer to UMass Lowell before completing all the requirements for an A.S degree will be evaluated on a case-by-case basis.

Understanding the UMass Lowell
Undergraduate Computer Science Curriculum

The Computer Science (CS) curriculum at UMass Lowell has a “systems,” as opposed to an “applications,” orientation. The curriculum strives to give students a solid theoretical foundation in the underlying software concepts that allow computers to do what they do and the reasons why those concepts are important. The curriculum does not focus on specific applications or computer languages. Applications are presented and discussed when they can clarify underlying concepts and serve as examples of practical implementations of those concepts. Computer languages are chosen for particular assignments, but the Implementation language is far less important than the concepts taught by that assignment. In fact, while the concepts covered in a course remain quite constant from one semester to another, the language used for assignments may change at the discretion of the professor.

The overarching philosophy of the UMass Lowell undergraduate CS curriculum is that languages, applications, and techniques change very rapidly in our field, and that students are best served by focusing on the underlying concepts that will be relevant long into the future, regardless of the language chosen to implement them or the application in which they are employed. For example, the UMass Lowell faculty feels that it is important to understand the basic structure of linked lists at the pointer level, not just how they can be manipulated using an Application Programmer Interface (API). Such basic structures are the same in all languages, while their APIs may differ significantly. If students understand a construct’s basic structure, they can use it in any language with any API, even those not yet invented.

In keeping with this philosophy, the first two CS courses at UMass Lowell - which cover basic computer concepts and elementary data structures – are taught using straight C on Linux systems. At many other colleges and universities, including Quinsigamond CC, these courses are taught using Java or C++ on Windows or Macintosh systems. Object-oriented programming is not formally introduced into the UMass Lowell undergraduate CS curriculum until the third
required CS course, which is typically taken in the first semester of a student’s sophomore year. Modern program design techniques and tools such as object-oriented analysis and design (OOAD), programming patterns, and the Unified Modeling Language (UML) are delayed until the fourth course. There have been endless discussions in the CS community about the desirability of “objects first” vs. “procedures first” curricula. Like most such arguments, there are advantages and disadvantages to both. One may be more suitable for some students, while the other may be more suitable for others. The issue is not which is better, but simply that the two are different.

It is important for transfer students and their advisors to realize this difference so that students can fully prepare themselves to make a smooth transition from one curriculum to the other. As noted in the previous section, the best way for Quinsigamond CS students to prepare themselves to transfer to UMass Lowell CS is to complete all the requirements for an Associate in Science (A.S.) in Computer Science degree from Quinsigamond CC. Most importantly, to get credit for Computing I through Computing III (91.101, 91.102 and 91.201) at UMass Lowell, QCC students must complete all three of the following courses at QCC and achieve a grade of “C” or better in each course.

1. CSC 109 Computer Science II
2. CSC 211 Programming w/ Data Structures
3. CSC 212 Software Engineering I

Most other QCC courses will transfer to UMass Lowell one-to-one. Please see the course equivalency list under “Specific Course Equivalencies” for specific pairings.

General Terms of This Agreement

1. QCC students who earn an A.S. in Computer Science and achieve a GPA of 2.5 or higher are guaranteed admission to the B.S. in C.S program at UMass Lowell.

2. QCC students may typically transfer up to 68 credits to be applied to the B.S. in CS program at UMass Lowell. Additional credits may be presented for acceptance, but at least 52 credits must be earned at UMass Lowell to earn a B.S. in CS.

3. In general, course credits earned at QCC may only be transferred to UMass Lowell at the 100 (freshman) and 200 (sophomore) levels. Some exceptions to this policy may be granted in cases where course equivalencies are clearly established.

4. Transfer of course credits that satisfy General Education (GenEd) and other university requirements is governed by the MassTransfer Policy. Students and academic advisors are encouraged to familiarize themselves with the details of that policy, which can be found at: http://www.mass.edu/library/etagappC.asp

Quinsigamond CC transfer students will be subject to all general education requirements of the University of Massachusetts Lowell as set forth in the University of Massachusetts
Lowell academic catalog. Students meeting the requirement of the Mass Transfer Block will be exempt from 34 credits of University general education requirements, but will be required to meet any specific Computer Science general education requirements.

5. This Articulation Agreement is approved for MassTransfer benefits including the acceptance of credits as stated in the MassTransfer Policy, and the tuition waiver.

6. University of Massachusetts Lowell and Quinsigamond Community College agree that this Agreement becomes effective on March 15, 2015, and is applicable to eligible students entering in the Fall 2015 semester, and thereafter, at the University of Massachusetts Lowell.

Definitions and Notes

Gen Ed Courses
- CS students must complete six courses (18 credits) that satisfy the University General Education Requirements. When appropriate, the benefits of the Mass Transfer Block will be applied.
- Three of these must be approved as Arts and Humanities (AH) Courses and three must be approved as Social Sciences (SS) courses.
- 42.220 Oral & Written Communication for Computer Science is required and counts as one of the three required AH Gen Eds.
- One of these must satisfy the CS Ethics Requirement.
- One must satisfy the University Diversity Requirement.
- Specific Courses may be recommended for different CS Tracks.
- See the University General Education Program website for more detailed information.

Natural Science Electives
- CS students must complete 12 credits of natural science courses.
- These are courses offered by one of the four natural science departments in the College of Arts & Sciences:
  - Biological Sciences
  - Chemistry
  - Environmental, Earth, and Atmospheric Sciences
  - Physics and Applied Physics
- Courses that fulfill this requirement must be classified as required or elective courses for the majors in those departments.
- This requirement may be satisfied by completing three 3-credit courses that do not include labs plus one 4-credit course that does include a lab (totaling 13 credits), or three 4-credit courses that do include labs (totaling 12 credits).
  - Thus, at least one natural science course must include a lab.
- An additional constraint is that the total number of credits applied to this requirement plus the number of credits earned in Math (92.xxx) courses must total at least 30.
• Specific courses may be recommended for different CS Tracks.
• See the CS Dept. Policy on Natural Science Electives for more detailed information.

Technical Electives
• CS Students must complete 6 credits of technical electives.
• These are courses offered by the College of Arts & Sciences (Science Division) or the College of Engineering.
• Courses that fulfill this requirement must be classified as required or elective courses for the majors in those departments.
• Specific courses may be recommended for different CS Tracks.

Non-Technical Elective
• CS students must complete 3 credits of a non-technical elective.
• These are courses offered by the College of Arts & Sciences (Fine Arts, Humanities & Social Sciences Division), Graduate School of Education, School of Health & Environment, or College of Management that have a specific non-technical focus.
• Specific courses may be recommended for different CS Tracks.

General (Free) Elective
• CS students must complete 9 credits of almost any course offered by the University.
• Courses taken to fulfill this requirement must not be below the level of any required course.
• Specific courses may be recommended for different CS tracks.
• See the CS Dept. Policy on General Electives for more detailed information.

Slots
• Courses listed in “slots” may generally be taken in any order, within the confines of specified course prerequisites.
• Some CS Tracks may put constraints on the ordering of these electives.
• Faculty advisors recommend that two-course sequences (such as Chemistry 1 and 11) be taken in successive semesters rather than taking part 1 and then waiting one or more semesters to take part 2.
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This agreement is effective March 15, 2015 and will remain in effect until March 15, 2018 with the provision that the terms specified herein will continue to apply to graduates who transfer from the above-identified Quinsigamond Community College Associate Degree programs into the University of Massachusetts Lowell Bachelor's degree program in Computer Science, within one year of the expiration of this agreement.