MIDDLESEX COMMUNITY COLLEGE

ACADEMIC PROGRAM REVIEW

OF THE

INFORMATION TECHNOLOGY PROGRAM

2009 – 2012

Program Review Committee

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SECTION I: Introduction

The Information Technology (IT) Associate in Science degree program was implemented at Middlesex Community College in 2005. The Program was developed to replace two existing degree programs: Web Development and IT Support Services. A timeline of program implementation and discontinuance is available in Appendix A. The program was developed because The Bureau of Labor Statistics (BLS) and the Massachusetts Division of Unemployment Assistance (DUA) identified IT occupations as high-growth areas. Local and national recruiting firms indicated that IT careers were being forecasted long-term as a high growth as well, and those positions were identified as crucial to fuel the productivity improvements needed for businesses to remain competitive. Creating the IT Associate in Science degree program to meet both current and expanding future demands for qualified IT professionals was, at the time, a high priority for the division.

Program critical competencies and student outcomes were determined from industry input, garnered first hand through Advisory Board meetings and Focus Groups. National Skill Standards for Information Technology were used to validate the conclusions formulated by Middlesex Community College's (MCC) industry partners. The courses in the Program were designed to give a technical foundation in IT, which would be augmented by employability skills and a general education background.

Since the recession of 2008 – 2009, the job market has tightened considerably, and the skills required for employment have changed. Industry feedback and a review of online postings have shown that most IT occupations now require a baccalaureate degree. Employees are expected to be well rounded, and job descriptions indicate that employers are seeking less specialization in the IT field and are looking for candidates who can fill many needs. Web development, for example has changed and is now more of a general skill for an IT professional rather than an area of expertise for a specialist.

Employees with narrow technical skills are most vulnerable to layoffs in a poor economy. Motivated, global-thinking individuals with the ability to "weave" technology and business together, with an understanding of the market, and a customer orientation, are the kind of employees who are most valued by industry. Employees with high-level employability skills, such as critical thinking, self learning, problem solving, and creativity, typically are more valued by employers.

While participating in the Program Review process, the department has determined that careers in IT are still viable, although the skill sets for those seeking employment have changed. The program was developed during an expanding economy at a time when technology was growing by leaps and bounds and companies were hiring almost anyone with any IT knowledge. Many IT professionals are currently seeking employment, and the competition for

positions is strong. It is difficult for someone with an Associate's degree and no experience to find employment at this time. However, as the economy rebounds, technology continues to be an integral part of the economic recovery, and positions in IT will play a crucial role in business expansion.

The faculty and dean believe that a new MIS transfer degree program needs to be investigated. As the economy improves, employees with both business knowledge and technological skills will be in demand. Industry focus groups have indicated that hiring managers want employees to know business concepts combined with the technological skills required to manage data and prepare reports and analysis efficiently and effectively. The department members will work (primarily with) UMASS Lowell to propose a Business Transfer option that combines a business backbone with technology based electives that will prepare students for the MIS concentration in the Business Administration degree at UMass Lowell.

SECTION II: Mission and Goals

1. State the mission of the program. Please indicate if the mission statement is new or has been significantly revised as part of a prior program review process.

The Information Technology (IT) Associate in Science degree was designed to prepare students either for transfer to a related baccalaureate program or for employment in entry-level IT positions. The program consisted of a degree in Information Technology: Liberal Studies with 3 different options:

- General Studies (AS)
- Transfer (AS)
- Web Development (AS)

The courses in the General Studies concentration were designed to give a technical foundation in IT necessary for entry-level employment. The Web Development concentration was designed to strengthen skills in a particular area of interest within IT.

Many industries base business systems on information technology. Entry-level employment in an area of IT design, development, administration, maintenance or other specialization related to the concentration selected is appropriate. The IT Program core covers foundational learning in areas common to all IT careers. The curriculum prepares students using both classroom and hands-on instruction to provide:

- Programming skills and experience with industry standard software in various IT applications.

- An emphasis on nationally developed skill standards for both IT foundations and concentration-specific areas.
- An integration of employability skills, including communication, teamwork, and workplace professionalism across the curriculum.
  Development of core business skills and identification of their relationship to information technology.

2. a. What is the relationship of the program's mission to the overall mission of the College as adopted by the Trustees and approved by the Board of Higher Education?

The IT Program's mission aligns to the College's overall mission as follows:

Middlesex Community College is a progressive and dynamic learning community, committed to providing educational programs and services that support personal growth and economic opportunity for its diverse student population.

Employability skills, which are a core part of the Program, are critical for career success. The new generation of IT employee will be required to be self motivated, capable of critical thinking, be a lifetime learner, have a "customer orientation," and know the interrelationships between his or her job and the company's success. Employability skills such as teaming, verbal and written communications are integrated into the program.

Dedicated to student success, the College provides excellence in teaching, personal attention, and extensive opportunities for exploration and growth.

Employers will continue to seek computer specialists who possess strong fundamental computer skills combined with good interpersonal and communication skills. Employability skills are integrated throughout this curriculum. These skills include: identifying customer requirements and incorporating feedback, working in a team, researching system requirements, defining the scope of a project, understanding technical specifications, communication skills, presentation skills, and time and project management skills.

Futhermore many students are advised by program faculty and receive additional advising and mentoring due to the proactive outreach of faculty and the IT Program Coordinator and Practicum Placement Coordinator.

The loss of the Practicum Placement Coordinator must be addressed. Considerable time and effort goes into the location and development of practicum sites. The Practicum Placement Coordinator also stays in contact with the site supervisor and the student one he/she is placed at a site. These functions are important to the success of the practicum.

Some discussion has happended around the idea of replacing the IT Practicum with BUS 214 Cooperative Field Placement. Although this would not address locating sites for students it would replace the need for someone to work with the site supervisor and the student as the faculty member who teaches BUS 214 performs that function.

Closely linked to the fabric of the community, Middlesex's partnerships with school, business and service organizations provide leadership in economic and community development and foster a culture of civic engagement and responsive workforce development.

The College's state-of-the-art programs in the liberal arts, basic skills, and more than fifty career and technical fields respond to student and community needs, providing a strong foundation for college transfer, employment, professional development and lifelong learning.

The IT Program curriculum prepares students using both classroom and hands-on instruction to provide:

- Programming skills and experience with industry standard software in various IT applications.
- An emphasis on nationally developed skill standards for both IT foundations and concentration-specific areas.
- An integration of employability skills, including communication, teamwork, and workplace professionalism across the curriculum
- Practical skills in developing IT projects with actual clients or faculty developed real world simulations.

The IT Transfer option is designed for students who wish to pursue a baccalaureate degree in an IT-related field. The Web Development concentration included courses in web design, programming, graphics, and multimedia. It provided students with a foundation in web fluency skills. Due to changes in the industry this concentration is no longer being offered. The General Studies option provides students with the flexibility to design their own concentration of technology-based electives. Students work with a program advisor to select courses that will meet individual career plans and interests.

The program mission and options (Career and Transfer) fulfill the college mission of developing a strong foundation for college transfer, and employability skills. Also the curriculum and project based learning activities foster lifelong learning habits and an understanding of the need for continued professional development.

b. Please explain what specific institutional goal(s) the program satisfies. You may include any goals referenced in the College Mission Statement or any goals illustrated in the Pillars of the College Mission Statement.

Institutional Goal	IT Department Strategy
A Dynamic Learning Environment Teaching is student-centered, emphasizing interactive learning strategies, state-of-the-art technology, workplace and community service, and the incorporation of a forward-thinking core curriculum. Online classes, tutoring and library resources give students added flexibility for learning. Vibrant co-curricular opportunities reflect a broad array of interests and encourage a strong voice in student governance.	IT courses within the program use problem based learning techniques. Each student has their own computer in IT courses. The program emphasizes hands-on experience solving problems the students are likely to see in their employment or in future courses in their academic endeavors. Instructors use industry standard software tools and use the most current technology available.
A Supportive, Caring Community Classes are small, with instruction tailored to the needs of individual students. Writing, Reading, and Mathematics learning centers and tutoring in all college subjects enhance achievement, providing added personal attention and support. By accessing the academic, career and personal counseling available at both Middlesex campuses, students receive timely, individualized guidance throughout their college experience and assistance in planning the next steps in their education and careers	Computer classrooms are small, usually with less than 20 students per instructor. The students in the IT program have a great deal of interaction with the professor. Students in the program develop a personal relationship with faculty members that is unique. Student Services works closely with faculty and have developed peer and professional computer tutors in the labs.
Responsive Workforce Development An active Business and Industry program delivers just-in-time education and training at corporate and agency sites, while on-campus and web-based skills development, professional development, and lifelong learning programs are offered throughout the region. A unique partnership with MCC's one-stop Career Place gives students and community residents ready access to extensive career counseling, placement, and training in an off-site facility created to serve regional economic development needs.	The division dean, faculty members, and administrative staff that support the IT program organize Industry focus group dinners and conferences to discuss the program annually. Faculty integrate both technical and work place skills into the classroom based on these meetings. Faculty members are encouraged to communicate industry information to students, and mentor students on career path planning based on the recommendations of the focus groups and advisory boards.
A Commitment to Excellence Through an emphasis on effectiveness, applied scholarship and instructional innovation, faculty and staff produce dynamic curricula and creative approaches to learning. An extensive professional development program supports exploration of effective teaching techniques, new technologies, and strategies that promote student achievement and success both in the classroom and beyond. College research and ongoing outcomes assessment reinforce Middlesex's commitment to continuous improvement and responsiveness in all of its offerings and services.	Technical skills required for success are woven into problem based learning rather than through traditional lecture formats. Faculty members are encouraged to develop simulated exercises that emphasize critical thinking. Skills such as problem identification, brainstorming, best practices research methods, and teamwork are all essential behaviors that complement technical fluency, and are accentuated in case studies, team based projects, and problem solving exercises. The faculty members encourage students to become lifelong learners in order to stress career success strategies. The Dean and Program Coordinator collaborate regularly with our BATEC grant partners allowing us

	to access industry best practices on a continued basis and to garner funding for peer tutors, conference funding and presentation opportunites and other business partners.

SECTION III: Data

The Institutional Research Office will provide a significant portion of the data. Your committee is encouraged to request additional relevant information from Institutional Research and to develop and conduct alternative assessments as well. Some examples of assessments that the committee may choose to implement are student focus groups and/or student surveys. Input from relevant internal groups such as Advising, Admissions, and/or connected departments will also be necessary. Please include a copy of the data from Institutional Research and all committee-developed surveys or focus questions in the Appendix of the review. Data from Institutional Research is available in Appendix H.

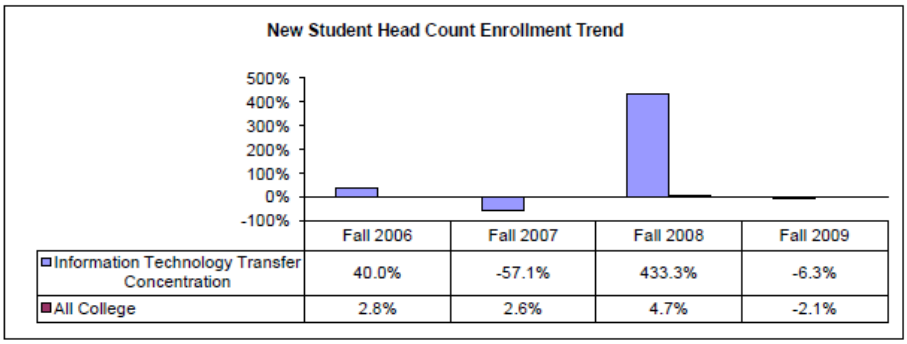
1. a. Please note important trends, patterns and issues that emerge through the enrollment, academic progress and retention data.

Information Technologies Transfer Concentration:

The program has maintained a low rate of enrollment from fall 2005 to fall 2007 then realized a considerable increate from 07 to 08 with an increase of 433%. Enrollment has remained steady since that time.

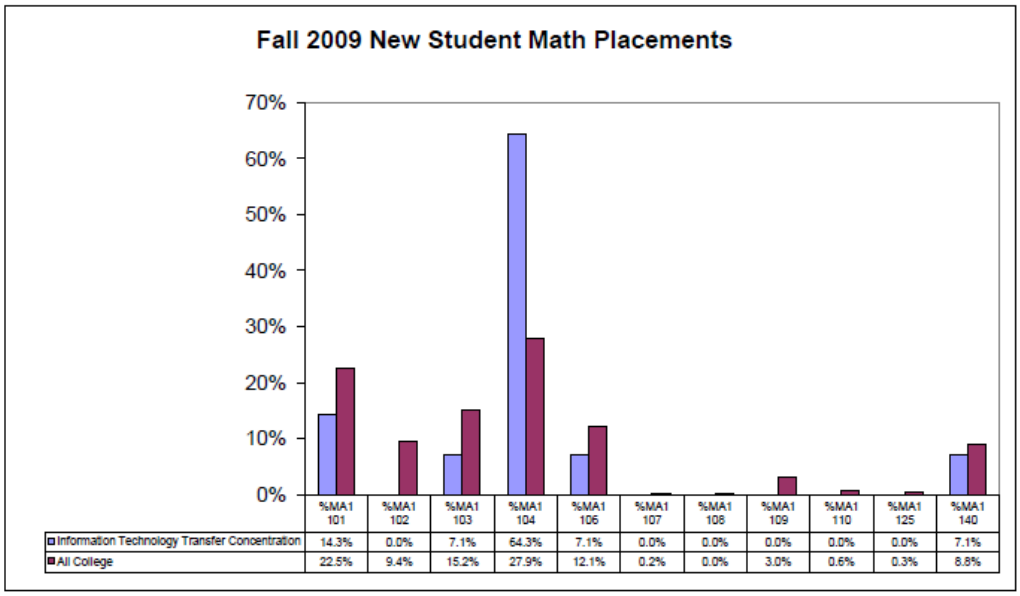
Middlesex Community College
Information Technology Transfer Concentration Program Review Data
New Student Head Count Enrollment Trend

Information Technology Transfer Concentration	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
New Student Head Count	5	7	3	16	15
Change from Previous Year		2	-4	13	-1
% Change from Previous Year		40.0%	-57.1%	433.3%	-6.3%
All College					
New Student Head Count	3829	3936	4039	4229	4142
Change from Previous Year		107	103	190	-87
% Change from Previous Year		2.8%	2.6%	4.7%	-2.1%



With regard to incoming CPT scores, ITTR students scores rise and fall with every new class of incoming students. By the fall of 2009 the ITTR students CPT scores closely reflected the general student population. In terms of math placement scores, ITTR students place into Algebra II at a much higher rate than the general student population. In Fall 2009 64.3% of ITTR students placed into Algebra II while only 27.9% of the general college population placed into Algebra II.

Middlesex Community College
Information Technology Transfer Concentration Program Review Data
New Students Math Placement

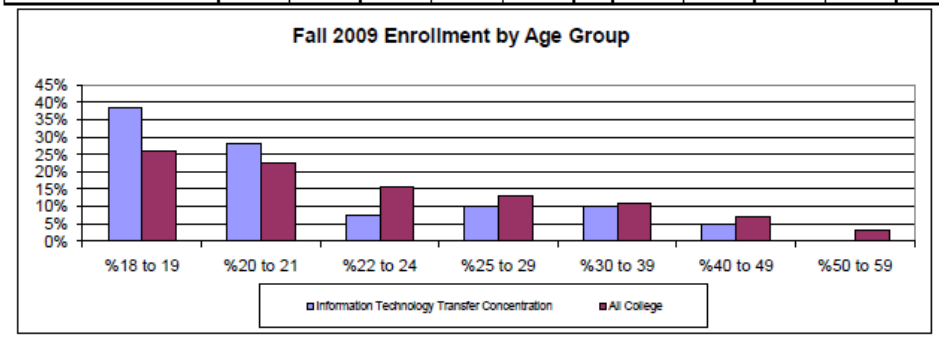


	%MA1 101	%MA1 102	%MA1 103	%MA1 104	%MA1 106	%MA1 107	%MA1 108	%MA1 109	%MA1 110	%MA1 125	%MA1 140
Information Technology Transfer Concentration	14.3%	0.0%	7.1%	64.3%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%
All College	22.5%	9.4%	15.2%	27.9%	12.1%	0.2%	0.0%	3.0%	0.6%	0.3%	8.8%

ITTR students are younger than the general student population. For example in the Fall of 2009, 38% of ITTR students are in the 18 – 19 age group while 26% of the general student population is in that age group. This is not surprising as older students tend to not enroll in programs that are designed for transfer. A slightly greater percentage of ITTR students are in the 25 – 29 and the 40 – 49 age groups than the general college population.

Middlesex Community College
Information Technology Transfer Concentration Program Review Data
Enrollment By Age Group

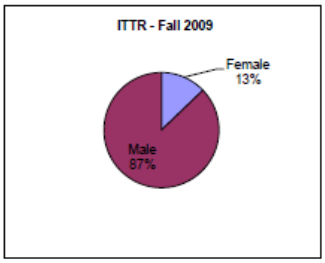
	Information Technology Transfer Concentration					All College				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Less Than 18	0	0	0	0	0	66	84	72	58	83
18 to 19	3	5	3	9	15	2070	2206	2200	2255	2477
20 to 21	1	2	2	3	11	1778	1806	1815	1923	2143
22 to 24	0	0	1	5	3	1152	1157	1265	1371	1506
25 to 29	0	2	4	5	4	945	915	989	1031	1239
30 to 39	2	1	1	2	4	1016	980	935	932	1020
40 to 49	0	1	2	2	2	739	680	610	671	651
50 to 59	0	0	0	0	0	226	245	220	233	290
60 Plus	0	0	0	0	0	63	54	45	51	78
Age Unreported	0	0	0	0	0	35	10	11	7	11
Total	6	11	13	26	39	8090	8137	8162	8532	9498



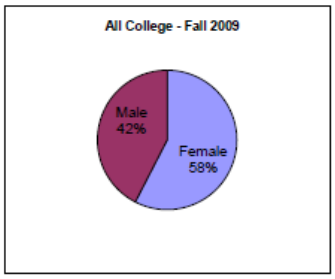
There is a significant difference in the gender of ITTR students vs. the general student population. The ITTR student population is 87% male and 13% female. The general MCC student population is 42% male and 58% female. This speaks to the need for a concentrated effort in recruitment of women in STEM (science technology engineering and math) fields as it relates to the ITTR program.

Middlesex Community College
Information Technology Transfer Concentration Program Review Data
Students by Gender

Information Technology Transfer Concentration	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Female	2	3	2	7	5
Male	4	8	11	19	34
Total	6	11	13	26	39
% Female	33.3%	27.3%	15.4%	26.9%	12.8%
% Male	66.7%	72.7%	84.6%	73.1%	87.2%



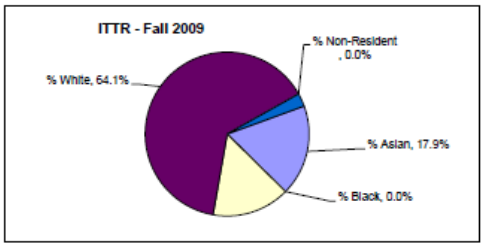
All College	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Female	4866	4857	4756	4908	5466
Male	3224	3279	3405	3622	4030
Not Indicated	0	1	1	2	2
Total	8090	8137	8162	8532	9498
% Female	60.1%	59.7%	58.3%	57.5%	57.5%
% Male	39.9%	40.3%	41.7%	42.5%	42.4%

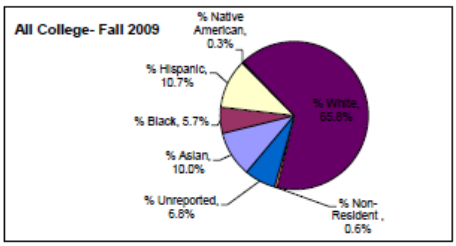


The ITTR program is less ethnically diverse than the general college population. The program is comprised of Asian and white students with no Black or Hispanic students and differs from the college population as a whole. Attempting to create greater ethnic diversity in the program could be another component of a STEM initiative.

Middlesex Community College
Information Technology Transfer Concentration Program Review Data
By Race/Ethnicity

	Information Technology Transfer Concentration					All College				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Asian	0	1	2	2	7	745	771	794	837	951
Black	0	0	1	1	0	423	482	475	516	542
Hispanic	0	0	0	3	6	750	812	841	973	1021
Native American	0	0	0	0	0	27	26	19	28	30
White	6	10	9	19	25	5981	5948	5862	5947	6252
Non Resident	0	0	0	0	0	43	61	73	77	58
Unreported	0	0	1	1	1	121	37	98	154	644
Total	6	11	13	26	39	8090	8137	8162	8532	9498
% Asian	0.0%	9.1%	15.4%	7.7%	17.9%	9.2%	9.5%	9.7%	9.8%	10.0%
% Black	0.0%	0.0%	7.7%	3.8%	0.0%	5.2%	5.9%	5.8%	6.0%	5.7%
% Hispanic	0.0%	0.0%	0.0%	11.5%	15.4%	9.3%	10.0%	10.3%	11.4%	10.7%
% Native American	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.2%	0.3%	0.3%
% White	100.0%	90.9%	69.2%	73.1%	64.1%	73.9%	73.1%	71.8%	69.7%	65.8%
% Non-Resident	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.7%	0.9%	0.9%	0.6%
% Unreported	0.0%	0.0%	7.7%	3.8%	2.6%	1.5%	0.5%	1.2%	1.8%	6.8%





Students are evenly dispersed on the two campuses with more students enrolling in day classes than evening. (62% day vs. 23% evening). This represents a challenge if these students want to continue as day students when they transfer on to a baccelature institution. University of Mass Lowell only offers an online program with some electives being offered in the evening. If an MCC ITTR students wants to transfer on they will need to attend Univeristy of Mass Boston or a private institution to continue their studies locally.

There are slightly more part time ITTR students than the college as a whole. This may be the reason more ITTR students have requested additional online courses. Since they may be working more hours, online courses may offer the flexibility these students need to complete more credits toward degree completion. This may be another reason why so few students graduate from the program and usually transfer prior to degree completion.

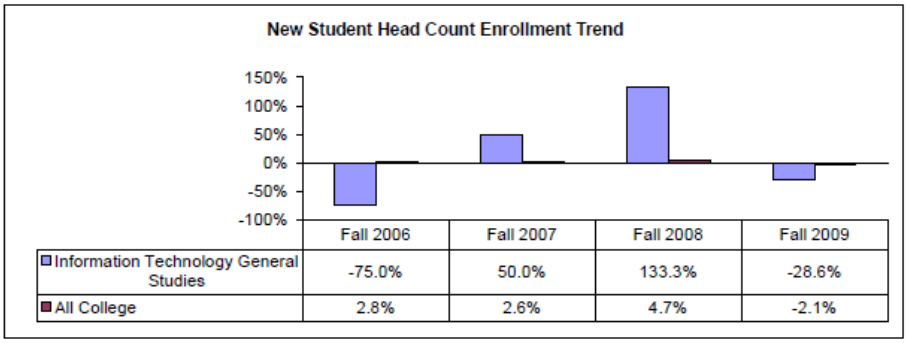
Information Technology General Studies

While enrollment remained fairly constant from fall 2005 – fall 2008 there was a significant increase in the enrollment in the IT General Studies (ITGS) program from the fall 2008 to fall 2009 academic years. Overall the program grew by 42% while the college enrollment grew by 15% during the same time period. Also, while applications to the college decreased 4.1% from 2008 to 2009, ITGS applications grew by 50%.

Middlesex Community College
Information Technology General Studies Program Review Data
New Student Head Count Enrollment Trend

Information Technology General Studies	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
New Student Head Count	8	2	3	7	5
Change from Previous Year		-6	1	4	-2
% Change from Previous Year		-75.0%	50.0%	133.3%	-28.6%

All College					
New Student Head Count	3829	3936	4039	4229	4142
Change from Previous Year		107	103	190	-87
% Change from Previous Year		2.8%	2.6%	4.7%	-2.1%

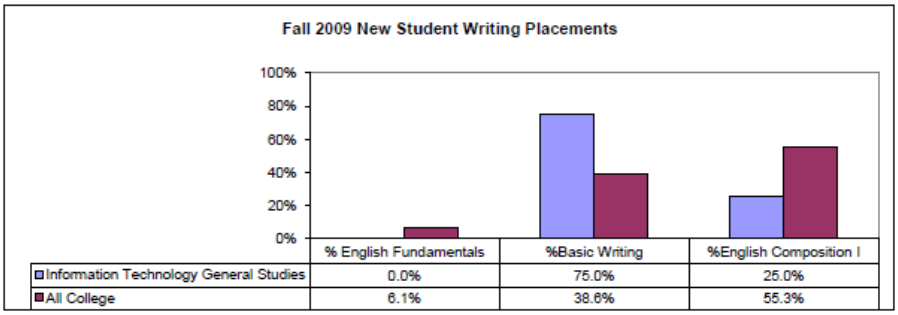


This could be the result of a soft job market and the return of IT professionals back to school due to lack of IT positions. This could also be a result of the implementation of the Massachusetts Vocational Technical Education Frameworks Information Technology Services Cluster in 2007. Students completing related coursework at the high schools may have seen the ITGS program as a pathway. We plan to survey students to get a sense of the interest and goals to determine ways to better support students in this program.

On average ITGS students placed into Basic Writing, were not required to take a reading class and did not place any higher in the math CPT than the Algebra I level. Students are generally evenly split between Fundamentals of Math and Algebra I.

Middlesex Community College
Information Technology General Studies Program Review Data
New Students By Writing Placement

	Information Technology General Studies					All College				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
English Fundamentals	0	1	0	1	0	191	200	202	209	194
Basic Writing	3	0	2	3	3	1285	1270	1340	1283	1236
English Composition I	3	0	1	3	1	1341	1438	1560	1663	1770
Total	6	1	3	7	4	2817	2908	3102	3155	3200
% English Fundamentals	0.0%	100.0%	0.0%	14.3%	0.0%	6.8%	6.9%	6.5%	6.6%	6.1%
%Basic Writing	50.0%	0.0%	66.7%	42.9%	75.0%	45.6%	43.7%	43.2%	40.7%	38.6%
%English Composition I	50.0%	0.0%	33.3%	42.9%	25.0%	47.6%	49.4%	50.3%	52.7%	55.3%



Middlesex Community College
Information Technology General Studies Program Review Data
New Students Math Placement

	Information Technology General Studies					All College				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Fundamentals of Mathematics(MA1101 or MAT 060)	3	1	1	0	2	779	816	837	821	764
Fundamentals/Algebra I(MA1102 or MAT 065)	0	0	0	2	0	256	298	282	289	319
Algebra I(MA1103 or MAT 070)	1	0	2	2	1	521	536	543	563	514
Algebra II(MA1104 or MAT 080)	2	0	0	1	0	703	737	874	880	945
Intermediate Algebra(MA1106 or MAT 100)	1	0	0	1	0	321	329	357	393	412
% Precalc-Business/Social Sci I(MA1107 or MAT 180)	0	0	0	0	0	91	111	82	30	6
Precalculus for Science(MA1108 or MAT 185)	0	0	0	0	0	1	1	1	1	1
Precalculus I(MA1109 or MAT 189)	0	0	0	0	0	1	1	22	80	103
Precalculus II (MA1110 or MAT 190)	1	0	0	0	0	26	18	22	23	19
Calculus I for Science (MA1125 or MAT 290)	0	0	0	0	0	13	13	9	8	10
Algebra I/II (MA1140 or MAT 075)	0	0	0	1	1	325	306	293	335	299
Total	8	1	3	7	4	3037	3166	3322	3423	3392
%MA1101	N/A	N/A	33.3%	0.0%	50.0%	25.7%	25.8%	25.2%	24.0%	22.5%
%MA1102	N/A	N/A	0.0%	28.6%	0.0%	8.4%	9.4%	8.5%	8.4%	9.4%
%MA1103	N/A	N/A	66.7%	28.6%	25.0%	17.2%	16.9%	16.3%	16.4%	15.2%
%MA1104	N/A	N/A	0.0%	14.3%	0.0%	23.1%	23.3%	26.3%	25.7%	27.9%
%MA1106	N/A	N/A	0.0%	14.3%	0.0%	10.6%	10.4%	10.7%	11.5%	12.1%
%MA1107	N/A	N/A	0.0%	0.0%	0.0%	3.0%	3.5%	2.5%	0.9%	0.2%
%MA1108	N/A	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
%MA1109	N/A	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	2.3%	3.0%
%MA1110	N/A	N/A	0.0%	0.0%	0.0%	0.9%	0.6%	0.7%	0.7%	0.6%
%MA1125	N/A	N/A	0.0%	0.0%	0.0%	0.4%	0.4%	0.3%	0.2%	0.3%
%MA1140	N/A	N/A	0.0%	14.3%	25.0%	10.7%	9.7%	8.8%	9.8%	8.8%

ITGS students are generally older than the average student population. Also there are a significantly higher percentage of males in the program than in the college as a whole. 88% of the students in the ITGS program are male vs. 42% in the college. This again speaks to the need for STEM initiatives that target women in IT.

The program is comprised mainly of white and Asian students. The charts below compare the ethnic breakdown of the ITGS students vs. the college as a whole.

Student Ethnicity ITGS Fall 2009	
White	81.8%
Asian	18.2%
Student Ethnicity All College Fall 2009	
White	65.8%
Asian	10.0%
Hispanic	10.7%
Black	5.7%
Native	.3%
Unreported	6.8%

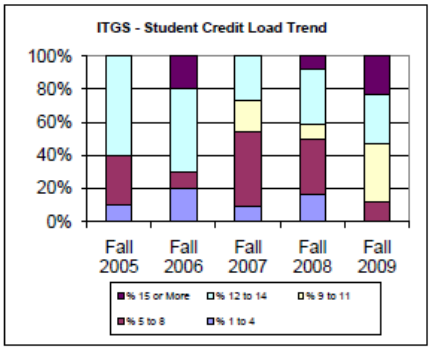
Enrollment is generally split between the two campuses however; there is a slightly greater number of ITGS students in Lowell than in Bedford 23.5% Lowell vs. 29.4% Bedford in Fall 2009. Interestingly, a much greater percentage of ITGS students take classes on both campuses than at the college as a whole. 47% of ITGS students study on both campuses vs. only 28.3% for the college in general. This is likely due to the availability of required courses with about an even split of offerings on each campus.

55% of the students attend classes during the day, 18% in the evening and about 27% split their schedules between day and evening.

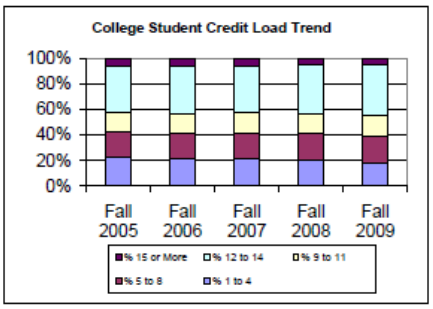
There are a greater number of students who attend classes part time in the ITGS program than in the college as whole. 46% of the ITGS students are enrolled in 5 to 11 credits while 39% of the college population is enrolled in 5 to 11 credits. It is suspected that more ITGS students work a greater number of hours than the general college population and therefore enroll in fewer credit hours each semester. This greater number of work hours may contribute to the lower program retention rate for ITGS students.

Middlesex Community College
Information Technology General Studies Program Review Data
By Student Credit Hours Enrolled

Information Technology General Studies	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
1 to 4	1	2	1	2	0
5 to 8	3	1	5	4	2
9 to 11	0	0	2	1	6
12 to 14	6	5	3	4	5
15 or More	0	2	0	1	4
Total	10	10	11	12	17
% 1 to 4	10.0%	20.0%	9.1%	16.7%	0.0%
% 5 to 8	30.0%	10.0%	45.5%	33.3%	11.8%
% 9 to 11	0.0%	0.0%	18.2%	8.3%	35.3%
% 12 to 14	60.0%	50.0%	27.3%	33.3%	29.4%
% 15 or More	0.0%	20.0%	0.0%	8.3%	23.5%



All College	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
1 to 4	1780	1708	1694	1689	1721
5 to 8	1596	1605	1674	1775	1989
9 to 11	1248	1237	1340	1389	1566
12 to 14	2946	3109	2981	3197	3682
15 or More	519	478	473	482	540
Total	8089	8137	8162	8532	9498
% 1 to 4	22.0%	21.0%	20.8%	19.8%	18.1%
% 5 to 8	19.7%	19.7%	20.5%	20.8%	20.9%
% 9 to 11	15.4%	15.2%	16.4%	16.3%	16.5%
% 12 to 14	36.4%	38.2%	36.5%	37.5%	38.8%
% 15 or More	6.4%	5.9%	5.8%	5.6%	5.7%



Regarding successful course completion, ITGS students complete courses at a higher rate than the college average of 73%. Below are the completion rates for program specific courses:

Course	Average Completion Rate 05 - 09
CAP 156 Database Applications	83.3%
CSC 101 Intro to Computer Science	70.5%
CSC 156 Linux Fundamentals	70.9%
NST 181 Networking I	83.9%
ITC 101 Introduction to IT	82%
ITC 125 Introduction to Web Publishing	73.6%

This higher completion rate could be caused by the fact that 52% of the courses are taught by full time (FT) faculty which is significantly higher than the 33% of courses taught by FT faculty at the college in general. Unfortunately this higher course completion rate does not translate to higher program completion rates.

From 2005 – 2006 thirty students were admitted to the ITGS program. Allowing 3 – 5 years for a student to complete course requirements so far there has been only one graduate in 2008 (the only graduate from the program from 2005 – 2009). We know that at least one student transferred out to another school; one student switched to MCC's LAS program; one student switched to ITTR and completed this degree and another completed the ITWD degree and there are at least ten students still actively making their way through the program. Since ITGS students require additional hours it could be assumed that ITGS students take longer to complete the degree than typical community college students.

Information Technologies Web Development

Student head count remained the same for the 2006 to 2007 academic year at a total of 14 students. Applications to the program did fall indicating that students are aware of the decreased need in the job market for positions in this field.

The majority of students attend classes three quarter time with between 9 and 11 credits. This is unlike the other IT degrees where students were here on a part-time basis.

There are a higher percentage of males in the program than in the college as a whole. Also there are a higher percentage of Asian and Black students in the program than in the general student population.

The program had its first graduates in 2007. Since the program enrollment was so small and an extensive research project uncovered that there were no jobs for Associate Degree Web Development candidates a decision was made to eliminate the program in 2008.

Course Completion Rates

Many of the program specific courses are common to all the options i.e. IT Transfer, General Studies, etc. A discussion of course completion rates for all the various options is reviewed in this section.

Course completion rates in the IT degrees and certificates exceed the college average rate of 74.7%. Many courses result in a 100% completion rate. The reason for this outstanding completion rate may be due to the modality of course delivery. From 2007 to 2009 many of the courses were taught in the Center for Self Paced Study (SPS). Faculty members from the ITC area were trained in SPS pedagogy and taught the courses in the Center.

Offering the courses thru SPS allowed many levels of courses to be grouped together and taught simultaneously by one instructor. This permitted courses to run with very low numbers using the expertise of one faculty member and compensating only that one instructor.

Since the elimination of the ITWD, enrollment in many of these specialized courses has diminished significantly. Therefore, it has become cost prohibitive to continue offering these courses in the SPS. In the fall of 2009, the Distributed Learning Department began to reserve seats in some of North Shore Community Colleges online IT courses. This allowed us to offer courses to groups of 3 students at a time and facilitates students' ability to finish their course work in IT program options we have eliminated.

A list of completion rates by course can be found in Appendix H.

b. Please comment on significant information that emerges from the Student Transfer and Employment Follow-up data.

Information Technologies Transfer

The IT department has transfer data from the 2007-2008 academic years. Of the five students who graduated from the ITTR program, two are reported as transferring to a bachelor program; one student to Salem State University (SSU) and one student went to UML. One additional student was reported as having transferred to UML before graduation.

Information Technology General Studies

The IT department has transfer data for one student in the program from the 2007-2008 academic years. This student transferred to Lawrence Memorial Hospital, School of Nursing. There was no employment data available.

Information Technology Web Development

The IT department has transfer data from the 2007-2008 academic years. Two students transferred to other community colleges. One student went to Nashua Community College and one student went to Northern Essex Community College. Not reflected in the data from Institutional Research at the time the report was run is the fact that one student went on to the Computer Science program at Framingham State.

c. Please summarize findings from student surveys, student focus groups, and/or other types of surveys and focus groups the Committee chose to undertake. (Data from surveys and/or questions developed by the Committee)

In the fall of 2008 the IT department created an electronic survey to assess the student and alumni overall program satisfaction. Full summaries are available in Appendix H; some highlights include:

- 86% of students report they enjoy their courses
- Only 70% of students felt they could easily register for courses
- Students are generally happy with class sizes
- Students were generally not happy with the times the courses were offered and the availability of semester offerings
- Students felt significant IT concepts were integrated throughout the program (93%)
- Students were satisfied with the infusion of communication, collaboration and critical thinking skills
- Students reported they felt prepared for employment however, faculty members are unsure students fully understood the job market.

As reported by informal and periodic surveys conducted by the Program Coordinator, some alumni have secured entry-level positions in desktop support-type positions but as of spring 2010 none of the graduates had secured a web development position.

SECTION IV: Program Analysis

Target Populations:

1. a. Is this program intended to serve a target population(s)? Please explain.
   b. Are there plans to recruit/market for this program by targeting any new or different groups? Please explain.
   c. Are there additional student recruitment and/or marketing efforts in which program faculty would like to be involved? Please be as specific as possible.

High School graduates interested in technology in many cases have been unable to find programs in public higher education that would allow them to pursue a degree related to technology. MCC initiated the IT degree in order to increase the number of IT pathways available to students interested in technology. Over the years 2004-2007, faculty members visited many local high schools (mostly vocational) to market the program, and efforts were disappointing. The reason most students give when asked why they would not choose these programs is the lack of jobs available with an associate's degree in today's economy. Students did comment that if jobs were available they would be interested in the program. Additional populations to target include:

- Current MCC Computer Science (CS) and Engineering students who are unable to attain proficiency in mathematics and science courses (most notably Calculus and Physics needed to graduate) and;
- Students enrolled in high school Robotics programs.
- Students aspiring to attend a baccalaureate program in IT but who were either denied direct admission to a program or those who might elect to attend community college first.

A survey conducted by Chelmsford High School (CHS), under the auspices of the BATEC grant, indicated that students enrolled in the high school Robotics courses are "seeking to pursue a career that is more of a technical or two-year nature of study" in comparison to those enrolled in Computer Science courses who were "highly committed to being accepted at a four-year college that will offer them a comprehensive computer science/and or mechanical major".

The department also recognizes an opportunity to target students interested in IT but who aren't able to attend the baccalaureate programs straightaway. We may attract students if we market the program as a pathway to a baccalaureate program i.e. as fulfilling the *MassTransfer* block and where possible, promoted as *linked* with specific baccalaureate programs. To that end the IT Program Coordinator, Lori Weir is working with the new Associate Dean of P-16 partnerships, Kimberly Burns to make updated materials available for review by additional institutions. We are targeting the University of Massachusetts at Lowell

(UML) and the University of Massachusetts at Boston (UMB) both of which offer Baccalaureate programs in IT (BSIT).

The department would like to work with Publications and Admissions to attract more students to the program.

2. Are there plans to change or add to strategies currently in place to assess the program's fit with student interest and market demand?

The IT degree was designed to provide the breadth of knowledge required by all IT workers. This, coupled with the integration of employability skills in the coursework, will help graduates of the program to achieve the specific career technical skills required for gainful employment, or to continue their education at a Bachelor Degree granting institution.

In analyzing current openings in the job market, findings are currently leading the members of the department to believe that in the wake of job losses of 2008-2010 (over 7 million jobs lost in the preceding 24 month period as of October 2010); a new breed of employee seems to be sought, one that combines business knowledge combined with technical skills.

The department has reviewed and plans to continue to review the Management Information Systems (MIS) program at UML. With the presumption that IT careers will continue to require baccalaureate degrees, and the feedback from industry focus groups that IT skills combined with good business fundamentals are essential, developing a potential transfer program with the University so students can matriculate into the MIS program at UML is an avenue the department is pursuing. Similar to the Business Transfer program where students go on to UML to pursue degrees in Business Administration, Marketing, or Accounting, the department is currently engaging in an investigation of this potential transfer program that would be appropriate for students to obtain a degree in MIS at UML. Please see Appendix B for a summary of initial findings.

3. Are program faculty and staff currently working with the Academic Planning Center or other areas of the College to interest students in taking courses in the program? Describe these interactions and the roles that the parties play.

The IT department has worked with Admissions Office and the Academic, Career and Transfer Counseling office to apprise them of changes to the program. This is typically done by providing pertinent information to the division dean to disseminate as needed. After the anticipated reorganization of Academic Affairs, and following discussions with UML and UMB about the possible Business/Technology Transfer program, the Comittee will meet with Publications, Admissions and the Academic, Career and Transfer Counseling staff to further inform them of and changes or additions to programs within the department.

4. Please comment on any Advanced Placement (high school) or Articulation Agreements (4-year institutions) that applies to your program. Are the agreements current and signed by all partners? What percentage of students in the program takes advantage of each agreement?

Advanced Placement (AP) credit; there is only one course in the program for which students could receive AP credit, CSC101. The CS Department awards credit to those students who complete the Advanced Placement Computer Science exam. According to the 2007 CS Program Review there were two students in the six years prior who were awarded AP credit. These students were not in the IT program.

High School Articulation: The College has articulation agreements with area high schools that include credit for courses in the program. Most of these agreements have been in place since 2004-2006 and were reviewed and updated in spring of 2010. Articulation credit is given for the following courses/to the students in following schools:

- NST 121 - Nashoba, Minuteman, Greater Lowell, Greater Lawrence, Lowell, Shawsheen, Cambridge
- CSC 101 - Greater Lowell, Minuteman
- ITC 125 - Greater Lowell, Lowell
- NST 181- Lowell, Minuteman, Cambridge
- ITC 101 - Lowell, Cambridge

In analyzing data for articulation credit awarded to students from five schools (Nashoba, Minuteman, Greater Lowell, Lowell, Shawsheen) between Fall 2007 and Fall 2009, we awarded zero credits to 25 students that matriculated into the IT program yet there are between one and five courses (depending on the school, as noted above) that students could potentially receive credit for (if they were enrolled in a related program). Several possible reasons exist for the lack of credit awarded including:

- Students did not attend the related high school program eligible for credit (for example, they were enrolled in Early Childhood at the high school vs. IT)
- Students did not meet the cumulative requirement of B or better
- Many of the agreements were outdated and it may have been hard to make a match between the courses.
- Students were not aware they were eligible for and didn't seek credit
- Students did not meet the math prerequisite requirement (based on ACCUPLACER® Scores)

The latter three conditions and are being addressed as follows:

- As it pertains to the currency of the agreements, the Program Coordinator, Lori Weir, was assigned to manage articulation reviews for the Business, Engineering and Technology Division. She worked closely with the faculty in the division as well as faculty from the Computer Science Department to facilitate and manage the reviews and then she worked with Cathy Pride, at the time the Associate Dean, Academic Programs & Articulation, to update all agreements. As of spring 2010 all agreements reflected current course offerings and numbering of both the high school and the college thus facilitating the process of reviewing transcripts and identifying students eligible for credit.

- As it pertains to student awareness, the Office of Admissions is increasing their efforts to get information (about articulation agreements) out to the high schools, including making agreements available on the web and including information about articulations in Guidance newsletters.

- "Although we had agreements in place for five of the courses in the IT program, no credit was awarded for any of the courses during 2007-2009. One factor was the College's policy of requiring high school students to meet the same prerequisites as our native students as it determined by placement scores. If a student's placement test indicated he or she had met the same competencies, they would be awarded credit; if they didn't, they would not receive the credit. For example; if a course required "enrollment in or successful completion of MAT 070, Algebra I" and a student placed into MAT 060, Fundamentals of Math, they would not be eligible for credit—even though they met all other terms of the articulation agreement including the requisite B or better in their program. The argument in favor of this practice: without a foundation of math students couldn't have the same depth of understanding and therefore couldn't have met the same competencies. This policy impacted the awarding of articulation credit for the following courses in the IT program: ITC 101, NST 181, ITC 125 and CSC 101. The argument opposed to this practice: we don't want to set students up for failure but we also don't want them duplicating coursework. If the faculty that evaluated the curriculum have determined that students who complete the program of study with a B or better have met all the equivalent competencies, including relevant academics as applied, placement scores should not prohibit them from receiving credit.

In Fall of 2009 a group met to discuss this issue including, Cathy Pride, Dean of Articulation, Judy Hogan, Dean Business, Engineering and Technology Division, Linda Young, Dean Math and Science, Professor Robert Bowles, Computer,

Software and Networking Chairperson and Professor Carol Hay, Mathematics Department Chair. It was decided we would conduct a pilot to look at the efficacy of granting students articulation credit regardless of their placement scores. In the Fall 2010 19 students received articulation credit. With a change in leadership in the area of articulation, we need to follow-up on this status of this pilot.

Articulation with Four-Year Institutions: At this time we have no articulation agreements with four year institutions. Under the auspices of the BATEC grant, the department has had several discussions over the span of three years with partners at the UMB. They have agreed to accept various courses for transfer credit however; no formal agreement has been reached. We continue to encourage the BATEC Leadership to advocate for articulation and/or approval as a *MassTransfer* linked program. See Appendix C for a table listing course transfer/alignment with our courses and UMB.

The department has made several attempts over the past few years to meet with the UML IT Program's leadership, Anne Marie Hurley, and initiate conversations regarding articulation but we have been unsuccessful. Upon analysis of their online Transfer Dictionary we can ascertain that UML will also take select courses in transfer. As Kim Burns, the Associate Dean of K-16 Partnerships forges new relationships; we will continue to pursue these conversations with her assistance. See Appendix C for a table listing course transfer/alignment with our courses UML.

Although the IT program has no formal articulation agreements, the ITTR program has been approved as a linked program by select baccalaureate institutions under the *Mass Transfer* agreement. Below is a summary of the schools that approved the program as of March 2011:

MCC ITTR Mass Transfer Status -		
Bridgewater	Approved*	School of Arts & Sciences/School of Business *(pending removal)*
Fitchburg State College	Pending	
Framingham State College	Approved	Computer Science
Mass College of Liberal Arts	Approved	B.S. in Computer Science
Mass Maritime	Pending	
Salem State College	Pending	
Westfield State College	Denied	Need to evaluate courses
Worcester State College	Denied	No comparable programs
UMass Amherst	Approved	College of Social and Behavioral Sciences College of Humanities and Fine Arts
UMass Boston	Pending	
UMass Dartmouth	Pending	
UMass Lowell	Pending	Declined UMass Lowell does not have a comparable major in the day school curriculum.

External Perspectives:

1. a. Based on a review of other college catalogs, list the colleges in our general area that have similar programs and comment on significant differences from the ones we currently offer that bear further exploration.

BUNKER HILL COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The Computer Information Technology program mission is two-fold. CIT prepares its students for entry-level careers as database professionals through the Associate in Science and Certificate Database Programming & Administration Programs, and also prepares students to transfer to four-year college.	Both transfer and certificate programs available. A Database concentration available. Degree Type: Associates of Science (AS)	No Information Technology program. Closest related is Computer Information Technology. No Web concentration is available. Course curriculum is very different from the MCC course curriculum. Degree Type: Associates of Arts (AA)
CAPE COD COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
Students in the Information Technology Associate of Science degree program acquire a wide range of technical skills that prepare them for various positions in the information technology field. Since many technology clusters are available in the IT world, concentrations that provide in-depth education are available for students.	Course curriculum is similar to the MCC General Studies in Information Technology. Degree Type: AS Enrollments? Graduates?	No Database concentration available. No Web concentration available.
GREENFIELD COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The program is for students interested in applying knowledge of microcomputer operating systems, software, and networks to business needs. The program teaches the use of current application packages in databases, spreadsheet, and word processing, single-user and network operating systems, and database development and programming. A foundation of business courses is included.	Course curriculum is similar to the MCC information technology general studies. Degree Type: AS Enrollments? Graduates?	No Information Technology program available. Closest related is Computer Information Technology. No Database concentration available. No Web concentration available.

MOUNT WACHUSETT COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The MWCC program will prepare students for an entry-level position in the information technology field in areas such as web application development, e-commerce, networking administration, and desktop applications support. Students will also have a transfer option to a bachelor degree program.	Transfer program available. Career path program available. Course curriculum is very similar to the MCC course curriculum. Some similarities include the courses Microcomputer Database Applications, Networking Applications, Data Management Applications, and Computer Technologies. There is also a Web focus built into the curriculum. Degree Type: AS Enrollments? Graduates?	No Information Technology program. Closest related is Computer Information Technology **A Computer Support Specialist and Programming concentration available.** No Certificate program available.

NORTH SHORE COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
This program prepares students for transfer into the junior year of a four-year computer information systems curriculum. Transfer agreements currently exist with Nichols College and Massachusetts College of Liberal Arts. The program consists of courses in programming, systems development, and business.	Liberal Studies program available. Transfer program available. Enrollments? Graduates?	No Information Technology program available. Closest related program is Computer Information Technology. No Web concentration available. No Database concentration available. Course curriculum is very different from the MCC course curriculum. Degree Type: AA

NORTHERN ESSEX COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The NECC's Associate in Science Degree in Computer and Information Sciences: Information Technology Option where students will learn about the core aspects of IT, including computer hardware, applications software, the Internet and Web Page Development, computer networks, information security, interactive media and programming and operating systems. Graduates will be able to pursue many career paths.	Both a transfer and career path programs are available. There is also a Web focus built into the curriculum. Some course similarities include the courses Data Management Applications, Operating Systems Internet & Web Page Development/HTML, Introduction to Computer Science, and Introduction to IT. IT program available. 12 Students enrolled FA09	Liberal Studies concentration not available. No Web concentration is available. No Database concentration available. No Certificate program available. Degree type is AA

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The STCC Network security is a problem that almost every company faces, yet there are only a handful of two-year colleges nationwide that address this issue and none in Massachusetts until now. The biggest asset a company has is its data. The data must not be compromised, stolen, changed, or intruded upon. Graduates of this program will be prepared to assess a company's risk, document security procedures, implement those procedures, and check for security breaches in the system.	Career path programs available. Degree Type: AS Enrollments? Graduates?	Liberal Studies concentration not available. No Web concentration available. No Database concentration available. No Certificate program available. Computer and IT Security Program available.

QUINSIGAMOND COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The Computer Information Systems program prepares the student for immediate career opportunities in business *and* industry or to transfer to a four-year college or university. The Computer Information Systems program offers two Associate Degree concentrations: the Application Specialist Option and the Programming Option. The CIS program also offers two certificates degree: Application Specialist and Web Specialist Applications Specialist Option: The Application Specialist Option provides students with a thorough introduction to today's most widely used computer software applications. Further study can be accomplished through transfer to a four-year college or university.	Transfer program available. Certificate program available. Degree Type: Associates of Science Enrollments? Graduates? QCC course curriculum is similar to the MCC course curriculum. Degree Type: Associates of Sciences	No Information Technology program. Closest related program is Computer Information Technology. No Database concentration available. No Web concentration available.

BRISTOL COMMUNITY COLLEGE		
Brief Program Description:	**Similarities:**	**Differences:**
The program offers state-of-the-art education in the computer area. Many students take more than the required courses because the technology is available. With one additional Engineering course, students in this program are prepared to take the A+ Certification examinations, the recognized industry standards for computer service technicians. Programs are based in the Business Technologies building, where seven computer labs provide computer access for students. The optional Cooperative Education program places students in computer-related positions, where they can earn course credit, wages, and experience.	Transfer program available. Degree Type: Associates of Science Enrollments? Graduates?	No Information Technology program. Closest related program is Computer Information Technology. No Database concentration available. No Web concentration available.

ITT TECHNICAL INSTITUTE		
Brief Program Description:	**Similarities:**	**Differences**
Information technology (IT) is a diverse area of study encompassing several computer-based system and application areas. The advancement of computers and communication technology continues to have profound impact on our lives. A need exists for technically competent individuals to provide appropriate computing solutions for users. The objective of the IT program is to provide a broad-based foundation in the area of IT and a concentration in one of four IT options. In addition to technical knowledge, it is important for IT workers to be able to communicate, handle multi-tasking situations and to assess user needs when developing computer-based solutions. Applications Specialist Option: The Application Specialist Option provides students with a thorough introduction to today's most widely used computer software applications. Further study can be accomplished through transfer to a four-year college or university.	Information Technology program available. Career program available. Course curriculum is similar to the MCC course curriculum. Degree Type: Associates of Science	No Database concentration available. Computer Network Systems option available. Software Application and Programming option available. No Web Developer program available at MCC

When the program first evolved in 2006 an advisory group was assembled to provide input as to how MCC should proceed with goals, objectives, and courses. The IT curriculum has changed since that time to meet changing demands. In some cases the curriculum is similar to some of the colleges above and significantly different in other cases.

The majority of colleges indicated above do not have a "Database Concentration" in its IT program. This appears to be based upon a lack of industry demand for a specific concentration. As a result MCC reached the decision to also drop the dedicated database concentration from the IT program. NOTE: It is also apparent that database knowledge is essential and is typically addressed with one or two courses but not a full program. A dedicated "Web Concentration" has also lost a high demand due to an industry trend change. Some of MCC courses were similar to other colleges however that variety of courses being offered varied quite a bit.

The database concentration has already been officially dropped from the program. The main reason was due to high industry demands that students have a bachelor degree. Also, in our opinion, enrollments in this discipline at MCC were severely affected by the college's decisions not to run under enrolled courses.

Bunker Hill Community College IT program is now prospering. One reason for this could be that BHCC allowed their classes to run under enrolled giving their program an opportunity to flourish. It has been MCC's policy to typically cancel classes of small enrollments. A new course cancel process has recently been instituted which may allow for new program courses to be offered for subsequent semesters with low enrollment while a chort of students is established. We are hopeful that new programs will have suffient time to flourish in the community. With that being said however, an exhaustive search of jobs on Monster.com, Dice.com and placements thru the Career Place indicate that no jobs exhist in Database Management for an Assoicate Degree level individual.

Networking skills are crucial in the IT area and most programs include this course work. Concentrations are different depending on each colleges program.

An Associate Degree transfer program leading to a bachelor degree is essential; a career path program seems a possible option but is being effected by the the fact that a bachelor degree is nearly essential due to changes in the workplace. There is inconsistency from college to college as to providing a career path option.

Note: Program titles vary with each institution from IT, CIS to CIT. This causes a concern as to which direction we should and might take.

The IT/CIS programs from surrounding community college including North Shore Community College, Northern Essex Community College, and Bunker Hill Community College curriculums are very similar leading us to believe that we are heading in the right direction. However, at BHCC, their IT program includes a database concentration which is now prospering. This concentration should be considered in the future maybe as a Database transfer option to a bachelor program. As indicated above, an exhaustive search of several employment databases incuding Monster.com and Dice.com revelaed employment opportunities in Database Management for individuals with a bachelor degree.

b. Based upon the committee's knowledge of institutions outside our geographical area that have exemplary programs or are known for their 'best practices,' comment on significant similarities or differences at MCC and in what areas that bear further exploration.

LaGuadia Community College has long been considered a leader in education at the community college level. The committee decided to review the IT offering at LaGuadia and compare and contrast that curriculum with the IT program at MCC. After reviewing the program it was apparent that LaGuadia curriculum prepares students to be competencies in the area of business as well as information technology.

LaGuadia students take both accounting and Introduction to Business as well as management courses which prepare students to supervise in a Data Center environment. With the proliferation of Cloud Computing, it is expected that Data Centers will flourish thus creating jobs for students who have an understanding of the functions of this type of organization. As part of our activitiy plan we will consider the development of a Data Center Operations course based on the prevelance of such Centers in our region.

Another interesting revelation upon review of the LaGuadia program was the fact that their program is an Associate in Applied Science versus MCC's Associate in Science degree. We should investigate the idea of adapting the IT Career program to fit the requirments of an Associate in Applied Science. It may be possible to include additional career specific courses resulting in a student who is better prepared for the IT workplace.

Below you will find a copy of the Computer Operations program at LaGuadia;

COMPUTER OPERATIONS (AAS)

LaGuadia Community College

English: 6 credits	
Composition I: ENC/ENG 101	3
Writing through Literature: ENG 102	3
Math, Engineering & Computer Science: 3 credits	
Elementary Statistics I: MAT 120	3
Social Science: 3 credits	
Select one of the following courses:*	3
Any history course except SSN 183, SSN 199, SSN 240	
Introduction to Anthropology: SSA 100	
Cultural Anthropology: SSA 101	
U.S. Power and Politics: SSP 101	
Political Ideas and Ideologies: SSP 250	

Introduction to Sociology: SSS 100	
General Psychology: SSY 101	
Introduction to Microeconomics: SSE 103	
Introduction to Macroeconomics: SSE 104	
Business & Technology: 16 credits	
Principles of Accounting I: BTA 111	4
Introduction to Business: BTM 101	3
Introduction to Computers and their Applications: BTC 100	3
Data Center OPS: Basics: BTC 270	3
Data Center OPS: Advanced: BTC 275	3
Humanities: 3 credits	
Liberal Arts Elective[1]	3
Math, Engineering & Computer Science: 15 credits	

Introduction to Visual Programming: MAC 109	3
System Analysis and Design: MAC 110	3
Comparative Operating Systems: MAC 230	3
Introduction to Teleprocessing: MAC 260	3
Any MAC course (recommended: MAC 241, 250, or 265)	3
Cooperative Education: 6 credits	
Fundamentals of Professional Advancement: CEP 121	3
Full-Time Internship: CEP 201	3
(Both Day and Extended Day students are required to take CEP 121. Extended Day students may take CEP 201 or an unrestricted elective course.)	
Liberal Arts Electives: 5 credits[1]	
Any course in Communication Skills; Education and Language Acquisition; English; Human Services; Humanities; Library; Mathematics, Engineering, and Computer Science; Natural Sciences; Health Sciences; or Social Science EXCEPT when noted as an unrestricted elective in DegreeWorks or the college Catalog.	
Unrestricted Electives: 3 credits[1]	

Total Credits:	**60**
* For transfer to New York City College of Technology, General Psychology (SSY 101) is recommended	
[1] One of your elective courses in the categories above must be an **Urban Study** course. NOTE: BTN 195, SCN 195 & HUN 245 are non-liberal arts **Urban Study** courses, and, if chosen, will only apply to the Unrestricted Elective category (all other Urban Study courses will satisfy the requirements of the [1] categories above).	

2. a. Please describe mechanisms or procedures currently in place to monitor changes in the job market and review the program's currency and "fit" with the educational interests and needs in our region. Explain how these groups have contributed and/or impacted the program's offerings.

The IT Department has been active in seeking out job placement information and skill sets needed to be successful in the changing landscape of the IT industry. The Dean, Judy Hogan and Lori Weir the Program Coordinator have been active in national IT organizations and attend as many conferences as our budget will allow. They gather information at these meetings and often focus IT department meetings discussions around new knowledge gained at these events.

As an example of information gained from Industry feedback and a review of on-line job postings during the period of this review we know that many current IT occupations require a baccalaureate degree. On-line job postings also show that entry level IT positions, such as Help Desk Technician and Computer Support Specialist, are in demand.

Futhermore, the IT Department stays in close contact with Chris Brennan, the Executive Director of the Career Place in Woburn, Massachusetts to remain aware of employment trends in the region served by the college. The Career Place has also been a resource for information about private education providers and the courses and programs that are popular with clients of the Career Place. The Department looks at the curriculum of these providers such as ITT Tech on a periodic basis to be aware of their programs and to compare and contrast their curriculum to the MCC program.

b. Relevant external parties, such as advisory groups, corporations/agencies, professional groups, outside licensure/accrediting bodies, etc. If there is an advisory committee in place, please comment on the frequency of meetings and the contributions/impact the committee has had on the program. Include names of members and minutes of the meetings in the appendices of the program review.

When the program was first conceived there was an advisory group however, during the years 2006 – 2007 things were in a state of flux and the dean, Barry Werner, didn't want to convene an advisory group until we had stability. During this time we were investigating the practicality of petitioning the Board of Higher Education for program status and it was eventually decided that we would not. At about the same time there was a change in leadership.

After the period of transition and under new leadership, Dean Judy Hogan, we undertook the program review process. As part of the program review we convened a group of industry partners, many of whom have agreed to participate in an ongoing advisory capacity. This list is attached in Appendix D. During this process of program review we've identified, acknowledged and made changes to the program including dropping the Web concentration, making changes to align the program with *MassTransfer* and updating the curriculum in select courses. A summary of the focus group meeting/findings is included in Appendix E.

In addition to our internal monitoring, we also rely on Boston Area Advanced Technological Education Connections (BATEC)'s leadership team to monitor changes in the job market and the BATEC process to review the program's currency and "fit" with the educational interests and needs in our region. BATEC's Information Technology Workforce Skills Study was conducted in winter 2007, a job market analysis in 2006 and 2008, and an industry focus group in fall 2008. The workforce study has been instrumental in creating the rationale for infusing employability skills into the teaching. BATEC has provided professional development to foster the pedagogical and curricular shifts. Many MCC faculty have participated in BATEC sponsored professional development events.

BATEC market analysis has kept us informed of market and hiring trends but we have not made any significant changes as a result of the findings. The MCC focus group reinforced the BATEC study's findings regarding employability skills and is reflected in this review. At the time of this writing (spring 2011) BATEC is actively researching opportunities in IT in Health Informatics and IT Database.

Starting in Fall 2011 BATEC will commission Tech America to research and report on the IT landscape—an analysis of IT employment opportunities at the entry and mid-level.

As it pertains to outside licensure/accrediting bodies, according to a 2011 survey by CompTIA reported in ZDNet "companies rely on information technology certifications when hiring workers" 64 percent of IT hiring managers rate IT certifications as having high value in validating skills and 80 percent of human resources manager believe IT certifications will become more important over the next two years." This corroborates what we heard in the MCC IT focus group; certifications verify baseline knowledge and show initiative. (Dignan, 2011) In 2009 we polled the surrounding vocational schools and many reported the students in the Chapter 74 IT program receive certifications before graduating high school.

As a marketing strategy and an effort to align with industry demands, the Committee plans to review all certification requirments, compare against existing MCC course work and identify which courses or groups of courses preprare students to sit for vaious exams such as;

- CompTIA A+
- CompTIA Net+
- CompTIA Security+
- CompTIA Linux+
- Microsoft's Technology Associate and/or
- Microsoft's Certified Desktop Support Technician
- Microsoft's Office User Specialist: Database
- Cisco CCNA and/or CCENT

The investigation would also consider the feasibility of facilitating the testing here at MCC. The possibility of collaboration with the Business and Industry Division is high and discussions have begun to identify which certifications could be offered at MCC and if we could become a testing site for these certifications. This would allow us to leverage the equipment and faculty knowledge we currently have. Space requirments will have to be carefully assessed as the current Networking labs are full with credit and non-credit course offerings.

After the restructuring of MCC's Academic Affairs Division and with the input of from the April 2012 advisory board, we will establish an action plan for reviewing the report, gathering local input and making plans to respond to the information as it pertains to the programs currency and fit with regional needs.

3. Relevant internal groups or individuals, such as other departments, programs or areas at the college that: (1) utilize your courses as prerequisites for their courses and/or program or (2) supply prerequisites for your courses.

At this time there are no other groups, departments, or programs at the college that utilize ITC courses as prerequisites or as a requirement for their courses and/or program. Because the courses serve no purpose to other programs/areas and, because of the low numbers of students in the IT program pipeline, with the exception of ITC 101, Intro to Information Technology and ITC 125, Introduction to Web Publishing, the demand to fill classes varies. This has contributed to the rationale for dropping the ITWD program.

The Computer Science and Networking, Software Technology departments both supply courses for our program. Both of these programs have remained viable and as a result students rarely have trouble registering for CSC 101, Introduction to Computer Science with Visual Basic; CSC 156, Linux Fundamentals; NST 181, Networking I; or NST 281, Computer Networking Security.

We've recently (spring 2011) made changes to the math requirements as it pertains to the Pre-Calculus course requirements to reflect changes to the offerings in the math department. [A] This will allow for ease of registration for students entering the program. Returning students will need special advising in the event the pre-calculus course they need is no longer available.

4. Other populations (i.e., students, alumni, community members, cooperative education supervisors, practicum supervisors, service learning supervisors, community agencies).

There are no other populations that utilize the ITC courses as prerequisites for their courses or within their programs. There are similar non-credit courses offered through the Division of Continuing Education. Because of the nature of the courses (length, duration, time) they are likely more appealing to incumbent workers than those we offer (during the day over the traditional 15-week semester).

Please refer to the Evaluation of PSLO below regarding the IT program's Internship course and the feedback of the program's preparation of students for these internship experiences. The Committee would like to further survey internship site mentors to solicit feedback on the technical skills and the preparedness of graduates.

SECTION V: Curriculum

Program Student Learning Outcomes (PSLOs)

1. Identify your Program Student Learning Outcomes

The following Student Learning Outcomes have been adapted from national skill standards:

- Students will be able to write and debug a simple computer program
- Students will be able to develop and query a database
- Students will be able to install and administer Linux in a PC environment
- Students will be able to create, administer, and secure a network
- Students will display workplace skills such as teamwork, communication, and problem solving

a. Please provide your program's timeline for ongoing, annual assessment of its PSLOs.

2010-11	Display workplace skills; teamwork, communication, problem solving
2011-12	Write and debug a simple computer program
2012-13	Develop and query a database
2013-14	Install and administer Linux in a PC environment
2014-15	Create, administer, and secure a network

b. If applicable, discuss any changes you have made to your PSLOs and/or the ways in which the courses in the program support those PSLOs since your last program review.

Not Applicable

2. Identify the opportunities for student achievement of PSLOs

a. Map the way in which your program provides opportunities for students to progress towards achievement of each Program Student Learning Outcome (PSLO), by noting in which courses the outcomes are **Introduced (I)**, **Developed (D)**, or where students are expected to demonstrate **Proficiency (P)**.

Curriculum Map I: Course Opportunities for Student Achievement of PSLOs

PSLO	ITC 101	CAP 156	ITC 125	CSC 101	CSC 156	NST 181	NST 281	ITC 290
Display workplace skills such as teamwork, communication, and problem solving	I	D	D	I	D	D	D/P	P
Write and debug a simple computer program	I	I	D	P				
Develop and query a database		I/D/P						
Install and administer Linux in a Personal Computer (PC) environment	I			I	P	D		
Create, administer, and secure a network						I/D	D/P	

b. Please comment on the **sequencing of** opportunities for students to develop and achieve each PSLO within the program, as noted on Curriculum Map I.

Students have the opportunity to display workplace skills such as teamwork, communication, and problem solving throughout the program. Faculty members are encouraged to list the employability skill standards and soft skills that will be emphasized in addition to the technical skills in the courses on their syllabi. Faculty have been involved with BATEC grants since 2003 and continue to implement workplace skills. The IT, CS, and CSNT faculty were early implementers at the college regarding the creation of activities that require teamwork and problem solving skills.

Throughout the program, faculty emphasize the soft skills that are necessary to complement the technical skills students are learning. Some courses have outside guest speakers, industry experts, and panel discussion assignments embedded into the courses to emphasize the skills necessary for success. Assessment activities highlight reflection on the life skills and technical skills acquired in the classroom. Faculty share their assessment activities with one another and build upon each other's modules in order to ensure that skills build upon one another, and reinforce prior learning

c. Please discuss how the program supports faculty in their work to align course student learning outcomes with program and institutional student learning outcomes.

Most faculty members have participated in BATEC summer institutes, curriculum development conferences, and assessment projects. All faculty members have re-developed and documented projects that address program and institutional student learning outcomes. Many department and division meetings are dedicated to supporting this initiative.

3. Evaluation of PSLO I - *Graduates of the Information Technology Program will display workplace skills such as teamwork, communication, and problem solving.*

a. Please provide examples of representative course student learning outcomes that include or embed this PSLO from course syllabi where competency of the PSLO is expected.

See ITC 290 Syllabus in Appendix F.

b. Describe the process by which this Program Student Learning Outcome was assessed for competency. Include in your description:

- Which courses contributed evidence of student learning and achievement?
- Which assignments/projects/exams/activities within those courses generated the evidence?
- How was a sample selected from the full sets of contributed evidence?
- What criteria were used to assess student learning and achievement?
- Which faculty members assessed the evidence, and how representative are they of the faculty teaching in the program?
- How you created a block of time to conduct the assessments of student learning

The PSLO: "Graduates of the Information Technology Program will display workplace skills such as teamwork, communication, and problem solving" was examined across all courses by the committee and specifically in the courses where students are expected to demonstrate proficiency, ITC 290.

The Committee assessed PSLO I by analyzing the capstone course, ITC 290, Information Technology Internship. The tables below summarize this PSLO assessment as determined by mentor reviews of participating interns. Twice over the course of the semester students are assessed on their soft skills as outlined below. The original assessment criterion was crafted as part of the original course development and was passed on and adopted during the period SP07-FA09. During this time 20 students participated in internships and the table below summarizes how they were assessed by their mentors:

Original Assessment:

Skill Assessed	% rated Poor	% rated Average	% rated Outstanding
Appearance: personal, grooming, uniform, etc.	0%	40%	60%
Attitude: interested, courteous, confident, cooperative	0%	20%	80%
Maturity: accepts supervision, adapts to situations, accepts assignments, maintains composure	0%	30%	70%
Dependability: punctual, completes tasks, accepts responsibility	0%	20%	80%
Initiative: seeks new learning opportunities, seeks work to do, performs extra duties	0%	40%	60%
Interpersonal Relationships: rapport with coworkers, supervisor, consumers, etc.	0%	25%	75%
Amount of Supervision Required: to obtain acceptable quality and quantity of work	0%	30%	70%
Work Assignments: completes assignments required by mentor	0%	20%	80%

As a result of the review, the form was modified to better reflect PSLOs as noted below in the revised assessment. The summary below is for the period SP10-SP11. During this time 16 students participated in internships and the table below summarizes how these students were assessed by their mentors:

Revised Assessment:

Skill Assessed	Needs Improvement	Developing	Secure
Work Assignments: completes assignments as required	0%	6%	94%
Initiative: seeks new learning opportunities, seeks work to do, performs extra duties	0%	19%	81%
Communication – Receives, attends to, "listens to learn," responds effectively to verbal messages; organizes ideas and presents them logically, clearly, and concisely	0%	19%	81%
Attitude: interested, courteous, confident, and cooperative; accepts supervision, adapts to situations, accepts assignments, maintains composure.	0%	0%	100%
Critical Thinking & Problem Solving – Applies rules/principles to process/procedure; uses logic to draw conclusions Solves problems using reasoning, creativity, knowledge and past experience	0%	19%	81%
Interpersonal Relationships: rapport with coworkers, supervisor, consumers, etc.	0%	6%	94%
Amount of Supervision Required: to obtain acceptable quality and quantity of work	0%	6%	94%
Teamwork – Adopts, encourages, and cooperates toward attainment of common goals	0%	19%	81%

c. What did your program learn about student achievement of this PSLO?

The department feels their work with this PSLO is successful.

d. What curricular and/or instructional changes are planned within the program as a result of this assessment work (if any)?

Most instructors found that in hands on courses, assigning problem based learning projects proved to be more beneficial than the previous methodology of lecture and follow. Students, when presented with a problem, tended to be more invested in the solution and recognized their ability to learn how to learn. Additionally, faculty members are in agreement that setting the bar high motivated students to realize why they were learning employability skills. Students comment on how they are building upon their skills in successive classes – and learning in other classes was improved because their problem solving abilities improved. Classroom experiences are constantly analogous to real life situations, and career planning is easier to comprehend.

Faculty have been inspired to add student responsibility sections to their syllabi where they emphasize what employability skills students should be self assessing themselves on, and rubrics on self assessment have been added to many of the courses. Students are encouraged to take responsibility to be prepared for success upon leaving Middlesex. An example is as follows:

STUDENT RESPONSIBILITIES
The student should:

- Invest in the development of their employability skills
- Assess on a weekly basis the development of workplace behaviors based on:
    - Punctuality and regular attendance
    - Teamwork
    - Planning in relation to preparation and completion of assignments
    - Acquiring, organizing, evaluating, interpreting, and communicating information along with using computers to process information
    - Critical thinking
    - Troubleshooting
    - Decision making and problem solving
    - Developing personal qualities including responsibility, self-management, and integrity
    - Developing an understanding of the necessity for both technology skills and employability skills (competencies and foundation skills)

No particular changes are planned as the committee recognizes the College's Strategies For Success initiative reinforces the concepts in this PSLO and is targeting adjunct faculty for training.

Institutional Student Learning Outcomes

See Appendix G for detailed listing of MCC's Institutional Student Learning Outcomes (ISLOs)

1. a. Please provide your program's timeline for ongoing, annual assessment of the college's ISLOs as appropriate.

2010-11	Communication, Critical Thinking, Personal & Professional Development
2011-12	Knowledge & Skills
2012-13	Social Responsibility
2013-14	Global Perspectives
2014-15	Communication, Critical Thinking, Personal & Professional Development
2015-2016	Knowledge & Skills

b. If applicable, discuss any changes you have made to your program's support of MCC's ISLOs since your last program review.

Not applicable

c. As appropriate, map the way in which your program provides opportunities for students to progress towards proficiency level of MCC's Institutional Student Learning Outcomes, by noting in which courses outcomes are **Introduced (I)**, **Developed (D)**, or where students are expected to demonstrate **Proficiency (P)**.

Curriculum Map II: Program Opportunities for Student Progress toward ISLOs

	ITC 101	CAP 156	ITC 125	CSC 101	CSC 156	NST 181	NST 281	ITC 290
Knowledge & Skills	I	I	I	D	P	D	P	P
Critical Thinking	I	D	D	I	D	D	D/P	P
Communication	I	D	D	I	D	D	D/P	P
Global Perspectives	I	I	I	D	D	I	D	P
Social Responsibility	I	I	I	D	D	I	D	P
Personal & Professional Development	I	D	D	I	D	D/P	P	I

d. Please comment on the **sequencing of** opportunities for students to develop and achieve to ISLO proficiency within the program as appropriate, as noted on Curriculum Map II.

Please see the response to question #3, Evaluation of PSLO I, above.

e. Please indicate on the following pages as appropriate **how each ISLO is supported to proficiency achievement within the program and how that achievement is assessed. Where ISLO achievement is directly supported by PSLO achievement, you can refer the reader back to that section in Question 7, rather than re-writing it.** If the strategy for attainment of an ISLO is contained within a particular course, please list the course first, with the relevant activity (or activities) listed next to each course. If there is nothing currently in place that is intended to provide for the attainment of a particular outcome or to assess the extent to which the outcome has been realized, please leave the appropriate space blank. The blanks will help to identify areas which need further development.

Please see the response to question #3, Evaluation of PSLO I, above.

2. Describe any Learning Communities that are an integral part of this program.

There are no Learning Communities in this program.

3. Comment on experiential/ work-based learning opportunities in the program (i.e., co-op, internships, service learning). Discuss how the content of the experience relates to course credit. How do you calculate the number of contact hours required in relationship to the credit awarded? What percent of students participate in each of these activities? Indicate any problem being faced in incorporating work-based learning.

The capstone course in the program, ITC 290, Information Technology Internship, is an experiential/work-based learning opportunity. Students are placed in internships based on experience, related coursework, and mutual availability (site need and student schedule). Sites are chosen to match students' related coursework. As approved by Curriculum, students are required to do a minimum of 135 hours at the site.

Between spring 2006 and spring 2010 31 IT students were placed in internships. Students interned at the following companies: Ballos Associates, Townsend, MA, CompuCom, CBE Technologies, Inc., Boston and Woburn, MA, eDialog, Lexington, MA, Hands on Technology Transfer, Inc., Chelmsford, MA, The Lowell Sun, Lowell MA, Raytheon IDS, Billerica, MA, IBM, Westford, MA and Qualxserv, LLC, Tewksbury, MA.

ITC 290 Information Technology Internship allows students to gain practical workplace experience through employment in an IT position within a local company. In general students do well in the course. From 2007 to 2010 the average completion rate for this course was 66%. The mode for the course is 100%. During 4 of the 6 semesters, 100% of the students completed the Internship. During 1 semester, 1 student enrolled and that student didn't complete; thus skewing the data and generating the 66% course completion rate.

Back in 2009, it was difficult to place student in quality internship sites for the ITWD major. This followed with the findings of our analysis of the market trends of related web development jobs for students with a two-year degree. Also, in March of 2009 we polled the surrounding vocational schools and many reported they too were experiencing a lack of internship opportunities for students in the Chapter 74 IT, Programming and Web cluster. The survey respondents included Shawsheen Valley Regional, Billerica, Mass; Greater Lowell Technical High School, Tyngsboro, MA, Whittier Regional, Haverhill, MA; and Nashoba Valley Technical High School Westford. Our findings confirmed that the Web Development concentration would be best as either a certificate for displaced or incumbent workers or as part of a four-year computer science/programming degree.

There are three issues of concern to mention as it pertains to this experiential/ work-based learning opportunity in the program: a "work-around" for the

internship requirement, the transferability of the Internship course credits and funding for internship coordination.

- Students can petition to graduate with a Liberal Arts and Sciences (LAS) degree without completing the internship course required for the IT Degree. The IT program has had at least two students exercise this option. The committee did consider the role of the internship course and feels in an industry where experience is important qualifier the course serves a valuable purpose. We can't prevent students from exercising the option but we'll advise then not to.

- ITC 290 is not a transferrable course. The Massachusetts Experiential Education Committee, a statewide committee looking at the need for common policies, procedures, practices and the importance of the transferability of Co-op and Internship credits to four-year institutions and other community colleges, has created a common operations manual for co-op/internships shared by the 15 community colleges. The committee worked with the support of the Massachusetts Community College Executive Office including Bill Hart, Deputy Director, MCC EO and Francesca Purcell, Associate Commissioner for Academic and P-16 Policy, (Commonwealth Transfer Advisory Group). The committee will present the handbook to the Community College Presidents Council in March 2011. Lori Weir is keeping informed about this effort. Hopefully the work of the committee will change the transferability of the course.

- Internship placement and site supervision is managed by a part-time Internship Coordinator. This position is presently funded exclusively through the BATEC grant. In 2011 the Internship Coordinator was budgeted for fifteen hours a month times ten months. This coordinator was responsible for all aspects of placement including identifying potential sites, recruiting partners to participate and developing and maintaining the partnerships. As well as identifying the students for the appropriate sites, coordinating the interviews, providing guidance to the site mentors regarding the appropriate protocols and the related documentation and doing a site-check. Based on current enrollment, the number of students on internships is expected to grow. The BATEC funding stream ended on August 31, 2011. This is a vital position requiring a specific skill set and the sustainability of the position needs to be addressed. In the short-term we'd like the College to support this position, in the long term, we would like the College to consider centralized approach to internships.

4. Referring to the data supplied by Institutional Research, along with any other data available to the Program, comment on the role of developmental courses in the program. Do significant numbers of students in the program take developmental courses? What conclusions are you able to draw about the impact of these courses on students' preparation levels?

The IT program is not exempt from the Statewide or nationwide issue of a high number of students placing into developmental-level courses. Over the three year period from 2007-2007 most of students enrolled in the IT programs needed at least one or more developmental math courses (82 % of the ITGS students and 75.7% of the ITTR students). Overall, students in the ITGS program are more likely to need a developmental course than students in the ITTR program. Over the same period, 2007-2009, an average of only 33.7% placed into ENG101, 71 % percent required no reading and only 5% percent placed into MAT 100. Compare this to students who enrolled in the ITTR program over the three year period - 63.8% placed into ENG101, 77 % percent required no reading and 8% placed into MAT100. This suggests that student entering the ITGS program select this program as a soft-landing place—i.e. they have an interest in IT but are unsure of their ability to go on to the baccalaureate degree and the ITGS seems like an achievable goal. This is only speculation however.

An asset of both the ITGS and the ITTR programs (as compared to the Computer Science program) is that students can enroll in some of the technical courses while working through developmental coursework. Students who qualify for concurrent enrollment with MAT 070 can take ITC 100, NST 121 or CAP101 and some of the other electives required for students enrolled in the ITGS program (CAP and CAP courses). By allowing students to enroll in courses which they are engaged in hands-on work, we are more likely to retain students. As quoted on the North Central Regional Educational Laboratory Pathways to School Improvement web page: "Study after study has shown the value of hands-on learning. Students are motivated, they learn more, even their reading skills improve. How can you justify not doing hands-on science?" (Improvement, 1994) *Edwin, J.C. Sobey, National Invention Center, Akron, OH.*

5. Discuss any new strategies being implemented within your program to support student success. This could include efforts to establish consistent expectations for students, teamwork presentation skills, scaffolding learning within sequential courses, inclusion of experiential learning, (most faculty members bring authentic project requirements) collaborations with Academic Support Services and/or other support areas, curriculum revision, pedagogical sharing and innovation, etc. Please comment on the availability and adequacy of any support services being utilized.

During the process of this review we've implemented a number of new strategies including:

- A required 'job development workshop' for students in ITC290, Information Technology Internship, led by an MCC Career and Academic Counselor. The purpose of this requirement is to connect students with departments at the college that offer services to help students succeed and flourish after the classroom work has ended.

- Redevelopment of ITC 125, Introduction to Web Development to ITC 126, Web Programming and Development. The purpose of this change was to update our course and align with current practices as well as the equivalent courses at UML and UMB.
- Continued participation in BATEC activities as well as joint activities with our colleagues in the Computer Science department involved in the Commonwealth Advisory Information Technology in Education (CAITE) grant.
- Partnerships with the Academic Support Services as it pertains to the BATEC student leader program.
- Redesigned ITC 100, Exploring Technology via Title III Strategies for Success grant

6. Discuss ways in which your program ensures consistency in student learning and achievement for students taking courses in the classroom, through SPS, and online.

In most cases, one section of each course is offered each semester and courses are typically taught by the same faculty from semester to semester. The IT program has articulated student learner outcomes and leveraged grant funds to develop curriculum materials and we disseminate materials to new faculty teaching requisite courses. We encourage and facilitate the opportunity for them to meet with full-time or lead faculty who teach in the discipline area.

7. Discuss ways in which your program ensures consistency in student learning and achievement for students taking courses during the day and in the evening.

Typically, one section of each course is offered each semester and generally courses are taught by the same faculty each semester. Most of the part-time faculty have been with the department for many years.

8. In the event that there are admissions criteria for acceptance into the program, describe the rationale and process for establishing and reviewing the admission criteria. Do current criteria produce a pool of students who are adequately prepared to succeed in the program?

Not Applicable.

SECTION VI: Instructional Support

1. a. Please discuss the adequacy of the staffing level in the program to teach students enrolled in the program.

Until the college reorganization, all courses with the exception of ITC 101, Introduction to Information Technology and ITC 290, Information Technology Internship, were taught by full-time faculty in IT, Computer Science, Engineering and CSNT programs. A third of the courses in the program are taught by faculty in the CSNT program, and a third of the courses are taught by faculty in the Computer Science program. Professors John Femia and Fred Colangelo taught and advised IT students in the past. Because the majority of their teaching load was taught in Computer Applications, they moved to the Business Department at the time of the reorganization. Further, where ITC 101 is taught by only adjunct faculty, there is no one point-person for this course as it pertains to assessment for experiential learning or articulation reviews.

Since there are no dedicated IT faculty it is the recommendation of the committee that the college prioritize the hiring of a full time IT faculty member. This faculty member could serve as the IT Program Coordinator as well as providing teaching strength in the discipline.

b. Please discuss the adequacy of the staffing level in the program to advise students enrolled in the program.

The advisor to student ratio has been adequate however; the Computer Science Department (which advises a percentage of our students) lost one full-time faculty member in fall 2011. This change in staffing of full-time faculty will potentially impact the quality of advisement of students enrolled in the program.

As it pertains to staffing, currently there is no program coordinator for this program. Because the classes in this program are taught across many different departments, this role is extremely important and requires a large time commitment in order to serve the students in the program properly. The Program Coordinator position is essential to the program in that the responsibility for developing internship opportunities, placing students and monitoring their success is a key element of the program. Additionally, the program coordinator has been responsible for finding course substitutions for canceled courses at other institutions and keeping students in the program on track for graduation. This position was also charged with all articulation agreements. The department has been investigating program changes and developing new programs to transfer to UML and UMB. The Program Coordinator has been critical to this process.

It is crucial to the program that the college continues to fund this position. It is imperative that students are advised by an informed staff member—especially

those remaining students in ITWD so that the specific nuances of the program can be communicated to the students.

2. What specific support services and activities (i.e., tutoring, media, library, disabled student support, computer labs, service learning) does this program require? Please comment on the availability and adequacy of these services. Be specific about any current deficiencies or projected needs.

Tutoring is currently available and adequate for a number of our courses offered in both Bedford and Lowell campuses to support our current curriculum of courses. Tutors for technical courses are supported, in part, by the BATEC grant ($6000 per academic year) under the auspices of the "Student Leader Program". The program serves a couple of important goals—to build the individual student participant's employability skills and, to support the student body's (in particular the IT, CS, CSNT program's) needs for academic support in technical courses. When the BATEC funding stream for this service ends we will need the College to continue to support this so we at a minimum maintain the current level of service. As the program grows we will rely on Academic Support to determine the need for additional tutors.

Disabilities Support currently provides assistance with testing for students who require that service. One deficiency is that faculty will need training on how to work with Disabilities Support to effectively utilize their services.

Computer Labs are available on both campuses but require updates to meet curriculum demands. The specific requirements will be clarified once the new curriculum is clearly defined as mentioned earlier.

Software/license requirements are expensive. The IT curriculum requires programs in both the Bedford and Lowell campus for students to meet core demands. Software will be required in the classrooms on both campuses. It will be required to be installed in the classrooms, libraries and computer labs on both campuses. This will not only support our traditional classrooms but also support students enrolled in online courses that require the use of software and do not have the software installed on their home computers.

One adjunct faculty offered this: "Computer labs with up-to date software. IT (Jeff Durand) has been an excellent support for ITC 101."

3. How adequate and appropriate are program facilities and equipment? Please be specific about current deficiencies or projected needs.

The facilities and equipment are currently adequate for the program. There are no hardware or capital equipment needs for the program. As technology is constantly changing, there have been and will continue to be needs for the latest

software packages to keep the program current. The costs for new software purchases were not significant for 2011, but could increase in future years as technology changes. There will be the need to update networking equipment which will be coordinated with the CSNT faculty as part of their review.

Comments made by the Computer Science faculty in their 2007 program review:

> "Equipment problems exist on most PCs, such speed demands, switch power, software driver issues, and degrading monitors in both Lowell and Bedford campus with the exception of rooms AR101 (Bedford) and LC201 (Lowell). The program requires computer classrooms that contain up to date software and hardware. This year, several classrooms were upgraded in Bedford with new computer equipment. These classrooms are sufficient to run our software. Other classrooms, however, without the new equipment are insufficient in terms of speed, stability, and reliability to suit the Integrated Development Environments (IDEs) of our programming languages. Slower equipment frustrates students and faculty as fewer problems can be covered during class time. Currently not all our programming courses are scheduled in the upgraded rooms. MCC need CS classes to be scheduled only into rooms with the newer equipment, or we need the rooms we are scheduled into to be upgraded to newer equipment."

Technology improvements have been significant since 2007 however, the cost to continue to keep current continues to grow. An "ideal" could be a centralized location for all courses to be taught, such as a "technology center" similar to the Northern Essex facility.

4. Please describe any professional development needs of program faculty or staff.

IT causes us to "dance as fast as we can" as new technologies are developed. If we want our students to keep up with the changes, we need to model that behavior. Input from professionals in the field regarding ever-changing necessary technical and soft skills is important**.** The current full time faculty members need to increase their professional development in order to keep the program current with technology as it presently stands. Professional development requirements are ongoing and should be examined after the transition/reorganization has been completed. Projected for the Fall 2011 semester the Office 2010 program is required for Intro IT and Database Applications. . The department is currently

investigating how to integrate project management skills into the program, which could require professional development. Additionally, the faculty and staff members are reviewing Web 2.0 tools including video conferencing. Incorporating more server, wireless and virtual computing will be addressed in the fall with a joint meeting with the CSNT faculty.

Another area where we recognize a need to strengthen is the communication within and across departments. We see the need to meet more regularly with colleagues in the Computer Software, Networking program as well as the folks in the Computer Science program to discuss program development.

5. Describe the sources of program funding. Are the funds adequate to support the program? Is the current use of funds effective to realize program goals? Does the program leadership have input into the program budget?

Funding comes from the college thru the Academic Division Budet Process. Program Chairs, Assistant Deans and Deans works together to identify budget needs then submit the requirements usually in the April preceeding the new Fiscal year. Administration and Finance review the requests and apprise the divisions of the feasibility of the budgets. When necessary priorities are established within the divisions and across the divisions to meet the needs of the college as a whole.

When possible, other funding soruces are leveraged as well as equipment and personnel that might exists in other areas of the college. This is one of the benefits of having A&F review all budget requests. They can identify requests which may have already been filled in other areas of the college and facilitiate discussions between the divsions to investigate the possibility of sharing resources.

The division has been creative in its acquisition of professional development for example. We have accessed the training at corporations producing IT products. For example, we became a member of the EMC Institute which gave us acess to free training and curriculum materials for our CSNT faculty around security and virtualization technology. It is important to stay aware of such programs and facilitate the ability of our faculty to receive training in this way.

Regarding the program coordinator It is crucial to the program that the college continues to fund the IT Program Coordinator's position. The currency of the program depends on the expertise of the program leadership and the faculty. Jobs exists for graduates of the IT program but only if our students are prepared for the needs of the workplace.

SECTION VII: Program Evaluation Summary

This section should be completed based upon review and consideration of both the data supplied in **Section II** and the questions posed in **Sections III, IV, V, VI and VII.**

1. Program Strengths

Employability skills, otherwise known as student success skills which are a core part of the Program, are critical for career success. The new generation of IT employee will be required to be self motivated, capable of understanding "the big picture," capable of critical thinking, be a lifetime learner, have a "customer orientation," and know the interrelationships between his or her job and the company's success. These skills, as well as employability skills such as teaming, verbal and written communications, have been integrated into the program.

- Since 2003, the BATEC grant has provided faculty support to help adopt a pedagogy that is in line with Title III initiatives to foster communication, critical-thinking, collaboration, organizational and time-management skills;
- Department members have developed national skills standards for the IT industry;
- Computer classrooms currently have up-to date equipment and software;
- Class sizes are manageable;
- Classes are offered in computer classrooms where hands-on instruction can take place;
- The IT faculty have an excellent working relationship with the CSNT and the CS Departments; (The reorganization will move IT facuty to the Business Department and therefore there will be a gap in instruction. This is addressed in the Needs Improvement area of this document.)
- Peer and professional computer science and computer applications tutors are available;
- Industry connections are strong through focus groups, internships and collaborative projects;

2. Program Needs for Improvement, Proposed Plans for Improvements, Budgetary Implications, Timelines

Program Needs	Proposed Plans for Improvement	Financial Needs to Make Improvements	Proposed Timeline for Implementation
Program and Curriculum Development:			
Discontinue Web Development Option	Discontinued	None	Fall 2009 Completed
Align ITTR requirements with *MassTransfer* Block	Lori Weir prepare Program Proposal for Curriculum	None	Fall 2010 Completed
Update ITC 125, Introduction to Web Publishing	Examine UMB and UML courses and add Programming Concepts; to be done in two parts as follows: $500 stipend for evaluating UMB and UML courses and preparing revised Syllabus-supported by BATEC – SU10 $500 stipend for Curricular changes supported by Perkins funds	$1000	FA10 Approval SP11 Implementation Completed (New Course Number is ITC 126)
Update NST 181 and NST 281 to Incorporate more server, wireless and virtual computing concepts.	Completed	$16,000	Fall 2010 - Spring 2011 Completed
Update requirements based on changes to mathematics course offerings	Lori Weir prepare Program Proposal for Curriculum	None	Spring 2011
Pursue articulation for ITTR with UML and/or UMB.	Kim Burns and program leadership	None	On-going
Pursue status as "linked program" within the Mass Transfer database.	Kim Burns and program leadership	None	On-going
Align ITC 290 with best practices as outlined in the new *Massachusetts Community Colleges Experiential Education: Internships and Cooperative Education Handbook for Practitioners and Administrators.*	Review handbook and improve documentation and procedures for ITC 290 as needed. Program Leadership	None	Spring 2012
Monitor the transferability of ITC 290 as a result of the Massachusetts Community Colleges Experiential Education Committee's work	Program Leadership	None	On-going
Add language to ITC 290 course description - "Entry-level", CORI/SORI checking may be required based on the location of the IT intership site.	Program Leadership	None	Spring 2012
Investigate feasibility of new Transfer	Program Leadership in STEM and	None	2012 - 2013

Program combining Business and IT and if feasible, develop Transfer program that aligns to MIS degree at UML and UMB.	Business		
Increased communication within and across departments	Merge CSNT and IT departments- (merger discussed and endorsed by both departments.) Program Coordinator has periodic scheduled meetings with CS faculty.	None	Fall 2011
Develop an online section of ITC 101	Lori Weir	$1500	SP11 Developed FA11 Implement
Develop an online section of NST 281	Moe Moghimi	$1500	SP11 Developed FA11 Implement
Establish an action plan for periodically reviewing information gathered as it pertains to the programs currency and fit with regional needs and responding to that information.	Discussions at Department meetings; Advisory Board meetings;Survey Site Supervisors of practicum students	None	On-going
Investigate reviving Database strain	Program Leadership	None	Spring 2012
Investigate adding Health Informatics	Program Leadership	None	Fall 2012
Investigate the retention of IT students in the CSC courses and if retention is low, as we suspect, we will investigate the development of a specialized IT programming course.	Progam Leadership	None	Fall 2012
Discuss CSC101 with Margie. UMB will not accept on transfer for their intro course because their's is JAVA based. CSC101 course accepted at UML but only for elective credit.	Program Leadership	None	Spring 2012
Survey new students in all options to dwetermine ways to better support their needs	Program Leadership	None	Spring 2012
Investigate replacing ITC 290 Practicum with BUS 214 Cooperative Field Placement	Program Leadership	$3000 (possible need for an additional section to be split with other programs)	Fall 2012
Professional Development:			
Review Web 2.0 tools including video conferencing, microblogging and collaborative writing tools.	Program Leadership	None	Spring 2012

Training on how to work with Disabilities Support to effectively utilize their services	Workshop? Professional Development Day?	None	Spring 2012
Examine Professional Development needs after reorg	Program Leadership	None	Spring 2012
Office 2010	Program Leadership with IT	IT expense	Fall 2011 completed
Project management curriculum development	Program Leadership	$5000	Spring 2012 for Fall 2012 infusion
Staffing Support			
Support Peer Tutors for technical courses/Student Leader/Ambassador program.	Historically supported by BATEC; funds will end in August 2011. Identify a dedicated source of funds to support peer tutoring	$6000/yr	Fall 2012
Support position to assume Program Coordinator duties.	Dedicated source of funding for a Program Coordinator.	TBD	Fall 2012
Support Internship Site Coordinator/Industry Liaison position	Historically supported by BATEC; funds will end in August 2011. Identify a dedicated source of funds to support Internship Site Coordinator/Industry Liaison position.	TBD	Fall 2012
Support hiring of CS faculty to replace faculty and to maintain current-level of offerings and Advisors.	Program Leadership	TBD	Fall 2013
Spport hiring of Dedicated IT faculty to replace faculty who moved to the BEP Division	Program Leadership	TBD	Fall 2013
Marketing, Recruitment			
Attract more students to the program including a concentrated effort on the following populations: • women and minority students • high school students enrolled in technical electives	Conduct meetings with Publications and Admissions to discuss recruitment strategies Meet with Margie Bleichman to discuss activities designed to attract more women and minority students into the program.	TBD	Spring 2012
Attempt to attract more students into the program with radio and TV advertisement.	Program Leadership	TBD with Publications	Spring 2012/Summer 2012
Attract more students into the program by advertising at key search engine website such as Yahoo and Google websites.	Program Leadership	TBD with Publications	Spring 2012/Summer 2012
Program search engines so that MCC comes up at the top of that list when a search is conducted.	Program Leadership	TBD	Spring 2012

Collaborate with Publications to develop updated transfer information material for UML and UMB	Program Leadership	TBD	Summer 2012
Establish more partnerships with four year institutions in addition to UMB and UML	Program Leadership	None	Spring and Summer 2012
Retention			
Profile ITGS Population and determine needs; investigate the retention rate and strategies to improve retention for the ITGS program.	Program Leadership with IT/CS and CSNT faculty	TBD (possibility offer a stiped to faculty for work.)	Spring and Summer 2012
Look at stackable certificates	Program Leadership with IT/CS and CSNT faculty	None	Spring and Summer 2012
Hold Infomration Sessions with Enrollment Management to discuss career paths, curriculum changes, transfer information	Program Leadership	None	Spring 2012
External			
Continue work with existing industry partners and forge new relationships in an effort to a. maintain and develop new sites for internships and b. keep the program current and relevant to the needs of industry.	Support Internship Site Coordinator/Industry Liaison position. Conduct Advisory meetings	None	On-going
Track performance of students that received articulation credit for NST 181 and subsequently enroll in NST 281 to determine the efficacy of the pilot to award credit regardless of placement scores.	Program Leadership	None	Starting spring 2012 for a minimum of a two-year period
Investigate the need for aligning our course with industry credentials from a content and marketing perspective.	Need Working with Workforce Development Council http://www.monroecc.edu/depts/workforce/ http://www.bhcc.mass.edu/inside/564	TBD	On-going

Works Cited

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Improvement, N. C. (Ed.). (1994). *Perspectives of Hands-On Science Teaching* . Retrieved November 2010, from Perspectives of Hands-On Science Teaching: http://www.ncrel.org/sdrs/areas/issues/content/cntareas/science/eric/eric-2.htm

APPENDICIES

Appendix A

Timeline of IT Program/Concentrations

1998	1999	2000	20801	2002	2003	Fall 2004	2005	2006	2007	2008	2009	2010
WDC	WDC	WDC										
			WPBC	WPBC	WPBC	WPBC	WPBC	WPBC	WPBC			
			ITSS	ITSS	ITSS							
				WD	WD	WD						
							ITWD	ITWD	ITWD	ITWD		
							ITGS	ITGS	ITGS	ITGS	ITGS	ITGS
							ITTR	ITTR	ITTR	ITTR	ITTR	ITTR
							ITDB	ITDB				

Banner Program Codes:

WDC = Web Developer Certificate, not sure of "official" code
WPBC = Web Publishing Certificate
WD = Web Development AS
ITSS = IT Support Specialist Certificate
ITWD = IT Web Dev
ITGS = IT General Studies
ITTR = IT Transfer
ITDB = IT Database

Appendix B

Consideration of a Business Transfer Program with IT Component

Analysis of job openings indicates that an associate's degree in IT is insufficient for employment in today's economy, and that employers are currently seeking bachelor's degrees for new employment opportunities. Focus groups have indicated that there is a need for entry-level employees that have business knowledge that complement technical skills. The department is currently assessing the feasibility of Business transfer program that integrates IT skills with UMass Lowell and UMass Boston. This goal of creating this transfer program would be to prepare students for a 4 year degree in Management Information Systems. The latest revision for the current program content being investigated is as follows:

BUS 110		Introduction to Business	3
LGL 102		Business Law	3
BUS 120		Introduction to Accounting I	3
BUS 220		Introduction to Accounting II	
Choose two of the following			
	BUS 321	Intermediate Accounting I	3
	BUS 322	Intermediate Accounting II	
	BUS 222	Introduction to Finance	
	BUS 210	Principles of Management	
	BUS 240	Principles of Marketing	3
CAP 155		Spreadsheet Applications	3
CAP 156		Database Applications	3
ITC		**IT Elective**	**12**
ENG 101		English Composition I	3
ENG 102		English Composition II	3
HUMANITIES		Humanities elective	3
MATH		Mathematics elective	3
LAB SCIENCE		Science elective with Lab	3
SCIENCE		Science elective 3-4	4
ECO 140		Principles of Macroeconomics	3
ECO 150		Principles of Microeconomics	3
BEHAVIORAL SCI		Behavioral Science elective	3
			61

Appendix C

The following table lists the prior history of transferability of ITTR Program courses at UML and UMB:

MCC Course Number	MCC Course Title	Credits	UML Equivalent	UMB Equivalent
ENG101	English Composition I	3	42.101 College Writing I	ENGL 101 Freshman English I
ENG102	English Composition II	3	42.102 College Writing II	ENGL 102 Freshman English II
MAT180 MAT185	Precalculus for Business I or Precalculus for Science	3/4	92 199 Math 100 elective	MAT 130
MAT190	Precalculus II		92 121 Management Precalculus	Not accepted/No credit
MAT 182	Precalculus for Business I	4		New course FA10 Needs review
MAT177	Statistics	3	92.283 Introduction to Statistics	MSIS111 or MAT 125 Statistics
ECO140	Macroeconomics	3	49.202 Economics II	ECON 101 Introduction to Macroeconomics
ECO150	Microeconomics	3	49.201 Economics I	ECON 102 Introduction to Microeconomics
	Humanities Elective	3		
	Humanities Elective	4		
	Humanities Elective	3		
	Behavioral Science Elective	3		
	Laboratory Science Elective	4		
	Science Elective	3/4		
ITC 101	Intro to Information Technology	3	90.160 Intro to Information Systems	IT 110 IT Problem Solving
CSC101	Introduction to Computer Science w/VB	4	91.199 Computer Science 100 Elective	Not accepted/No credit
CSC156	Linux Fundamentals	3	91.199 Computer Science 100 Elective	IT 244 Into to Linux/Unix
ITC 125	Introduction to Web Publishing	3	90.219 Intro to HTML (Not in evening program anymore as far as I can tell) ITC 12590 219 Basic Programming	Not accepted/No credit/see below
ITC 126	Web Programming and Development	4		This is a new course approved FA10 and replaces ITC 125; UMB has given a nod of approval for IT 240 but needs official review.
NST 181	Networking I	3	90.299 Info Tech/Math 100 Elective	IT 246 Networking
NST 281	Computer Networking Security	3	90.299 Info Tech/Math 200 Elective	Not accepted/No credit /IT 428 Info Sec. more

				advanced.
CAP156	Database Applications	3	91.299 Computer Science 200 Elective	Not accepted/No credit/No match/Their Database course is SQL
ITC 290	Information Technology Internship	3	Not accepted/No credit	Not accepted/No credit

Appendix D

2010 Information Technology Advisory Board List

William Artemik
President
Innovative Systems Direct

Robert Bowles
Chair, Computer, Software, Networking Technology Program
Middlesex Community College

Jim Christensen
I. S. Director
AAA Merrimack Valley

Perry A. Conrad
Center Services Manager, Workplace and Media Services Information Solutions
Raytheon Integrated Defense Systems

Gina Dickey
Technology Support Specialist
Virtual High School Global Consortium

Judith Hogan
Dean Business, Engineering and Technology Middlesex Community College

Diane Hudson
Instructor, Computer Applications and Information Technology
Middlesex Community College, North Shore Community College

Brian Leary
Senior Support Engineer, Authoria, Inc., Waltham;
Instructor, Information Technology, Middlesex Community College

Robert Mannal
Security Consultant
RHM, Inc.

Paul McNeil
Teacher, Information Technology
Greater Lowell Technical High School

Lisa Panagopoulos
Coordinator Faculty Development and Support Continuing Studies, Corporate and Distance Education Adjunct Faculty, Information Technology
University of Massachusetts, Lowell

Joseph Patuto
Director, Technology Center
Middlesex Community College

Ralph Shaw
IS Infrastructure, Information Solutions
Raytheon Integrated Defense Systems

Neil Sheer
Associate Dean, Business, Engineering and Technology Division
Middlesex Community College

Duane E. Taylor
Lead Networking and Distributed Systems Engineer
Mitre Corporation

James Trombly
Delphi Technology Solutions, Inc.

Lawrence Wilson
Director, IT Security
Commonwealth of Massachusetts

Lori Weir
Program Coordinator, Information Technology
Middlesex Community College

Bill Willett
Managed Technology Partners
Vice President, Channel Operations

Appendix E

Gap Analysis—IT Program Industry Focus Group

On October 29 2008 the IT department held a one-and-a-half hour focus group meeting with participants from (17) area businesses including, Raytheon, Staples, eDialog, MITRE, Qualxserv, M3Snet, Innovative Systems Direct and Campus Works, Inc. The purpose of the group was to do a gap analysis of our curriculum and industry needs. Discussed was the following as it relates to the Information Technology (IT) Program: opinions on the technical merit of the curriculum, employers' needs/preparedness of graduates, current trends in IT. See Appendix X for a complete list of attendees and additional written feedback.

The following questions were prepared in advance of the meeting:

- In your years working in the field of IT what are some of the technical skills, knowledge and characteristics you value most?
- What are the expectations of an entry level professional in IT?
- What are the skill sets you need but can't find - current job openings?
- If you must downsize who do you keep? Would you outsource?
- What job titles in the area of IT exist in your companies/or the companies you support?
- Do you use interns? Do you consider interns or practicum experience useful? What are the qualities of successful Interns?

Below is a recap of knowledge, skills and abilities industry participants determined most valuable. The opinions expressed are those of the person that gave them.

Sub: IT Focus Group Meeting Summary

On October 29, 2008, a focus group made up of a combination of seventeen Human Resources and IT professionals met to discuss what the needs/preparedness and skill sets of college graduates holding an Associate degree in the area of Information Technology should be. The results of this information will then be used to help analyze our curriculum needs for our Information Technology program.

Some of the questions during the meeting ranged from:

- What are some of the technical skills do you expect from a college graduate holding an associate degree in Information Technology?
- What knowledge and characteristics do you expect from a college graduate holding an associate degree in Information Technology?
- What are the skill sets you need but have difficulty finding?

- If your company were to downsize what kinds of employees would your companies keep and what would you outsource?
- What are some of your entry-level job titles in the area of IT?

The majority consensus was that Information Technology students once graduated should be knowledgeable in the following areas:

Non-Technical Area:

1. Critical Thinking
a. How to approach and solve a problem
b. Troubleshooting skills
2. Teamwork
a. How to work together and pool resources for better results

Technical Area:

3. Networking:
a. Workings of TCPIP
b. Sub-networking
c. Installations
d. Basic Network Protocol
e. Knowledge of Routers
f. DNS
4. Security
a. Issues and Threats
5. Virtualization
6. Windows XP
a. Basic knowledge of the workings
b. Troubleshooting skills
7. Strong knowledge of Server 2003
a. Basic knowledge of the workings
b. Diagnostics/troubleshooting skills
8. Strong knowledge of Server Administration
9. Software installation and implementation
10. Software diagnostics for errors
11. Web Area
a. Not too much in the skills area was addressed in this area, however, the focus group did indicate that a developer be skilled in the following.
b. HTML
c. XML
d. Cascading Style Sheets
e. Working knowledge of the programs Flash and Dreamweaver

f. A knowledge of security issues and threats
g. Ability to work collaboratively with other departments (such as Graphic's and Marketing etc.)

Some of the job titles ranged in name from "Help Desk Specialist", "Field Service Technicians", to "Technical Support Representative" etc.

In many cases, it was the opinion that the certifications – A+, MCSE, Network + etc. were not as important because the technical requirements change so regularly. Technical skill sets were very important but also "teaming", "trouble shooting", and "critical thinking" was equally important.

Participants emphasized that MCC should differentiate its curriculum from technical school programs and certification programs by concentrating on workplace skills in addition to the technical skills as a way to differentiate certificate programs and certifications to that of an Associate degree.

It is the consensus of the committee that similar meetings with other smaller focus groups be held and use the acquired information to help define more specific skill sets so that we can effectively revise the IT curriculum of our to stay current with industry demands.

Oct. 29 Focus Group Attendees:

Contact, Title, Company
Norm Lombardi, VP Human Resources, QualxServ, LLC
James Cotter, IT technical training Director, QualxServ, LLC
Robert H. Mannal, Managing Director, RHM, Inc.
William Artemik , President, Innovative Systems Direct
Ralph Shaw, IS Infrastructure, Information Solutions, Raytheon Integrated Defense Systems
John Maltais, Ahura Scientific, Inc.
Joe Patuto, Director, Technology Support Services, Middlesex Community College
Janet Perry,
Jim Christensen, I. S. Director, AAA Merrimack Valley
Michael Joseph, M3Snet Corporation
John Doub, Vice President, Technical Services, e-Dialog
Duane Taylor, Mitre Corporation
David Sims, Information Security Representative, MIT Lincoln Laboratory, Security Services Department
Brian Rogers, Net Technologies
Bob Pliskin, Vice President, Bradford Industries, Inc.
Phil Gaudet, Staples
Julie Rursh, Campus Works, Inc., Middlesex Community College

Appendix F

Middlesex Community College

ITC 290, Information Technology Internship

Instructor: Lori Weir, M.Ed.
Email: weirl@middlesex.mass.edu
Office: Bedford Campus, Henderson Hall Rm. 124
Tel: 781-280-3859 (W) 781-944-5921 (H)
Office Hours: by appointment

Spring 2011
3 credits
Sec 01

Catalog Description

The Information Technology (IT) Internship is designed to facilitate transition from the academic environment to the high-tech workplace. Qualified IT students complete a workplace skills seminar and then spend at least 135 hours over a 10-13 week period in a supervised IT work setting performing tasks related to their course of study. Students also participate in online work that focuses on workplace issues based on students' experiences at the field sites. Students are qualified by a departmental internship screening committee based on their grade point average (3.0 or higher), program completion status (at least 45 credits) and IT Department recommendation. Internship availability may be limited by economic conditions; students are encouraged to contact faculty and begin the work of obtaining an approved field site before the semester begins.

Intended Course Outcomes

The overarching goal is for students to build upon what they have learned in the IT program and accumulate work experience in the IT industry. Internship experiences will prepare the students to enter into full-time employment in their area of specialization. At the onset of the internship experience specific learner outcomes will be developed and will concentrate on skill areas that relate to the individual's job description, the company's goals, the individual's academic or career goals or other relevant skills. Upon successful completion of the course the student shall be able to:

- Prepare necessary documents for an interview including, resume and cover letter and a thank you letter post internship.
- Demonstrate professional work ethic including responsibility to an employer, punctuality and dependability.
- Apply discipline-related knowledge to the field.
- Demonstrate the development of additional knowledge, skills, abilities related to the field.
- Apply foundation skills necessary to succeed in the workplace and show initiative in improving skills in the areas of: communication (listening, speaking), collaboration (including decision making, problem solving), critical thinking skills and the ability to apply technology to specific tasks.
- Describe formal activities and informal interrelationships of a cooperating facility.
- Make educational connections with real-world opportunities and choices.

Attendance

Students are expected to attend all hours as mutually agreed upon with the employer.

Assessment and Student Responsibilities

Satisfactory performance of the intended outcomes will be assessed as follows:

- Pre-internship job development meeting and resume preparation. (20 points)
- Successful completion of 135 hours of work as assessed and substantiated by the site supervisor (bi-weekly log sheets and mid-term and final review); this includes the development of a learning plan and the successful progress towards learning plan goals and internship outcomes as substantiated by supervisor assessments (55 points)
- Exit interview with site mentor or MCC's Academic and Career and Transfer Advising Office to review revised resume (5 points)
- A final reflection paper, thank you letter, and a revised resume (20 points)

Final Project Description Course #: ITC 125 Professor Fred Colangelo

PROJECT VALUE: *(20 Points)*

The student will be required to use the technical skills acquired over the past semester weeks. Upon completion of this project, the student should be able to demonstrate an ability to work individually, use critical thinking skills, and use the technical skills learned in this course to develop a functional website.

Project Objectives

At the completion of this project, the individual should be able to:

Develop and plan a purposeful real-type website

Write a project plan and description with the full project details *(outline attached)*

Design and create a website

Write XHTML code to create a Website; to include layout and format, links, and graphics, etc.

Create complex **Cascading Style Sheets** to control the entire look and layout of your Website

Create a maximum of 50% of your website pages using Dreamweaver. **(Use of Dreamweaver is optional)**

NOTE: If you don't have a running program, you can create your entire website by coding the html and CSS.

Project Requirements

For your website project, select **ONE** of the following topics:

Museum
Art Gallery
Summer Resort
Spa and Resort
Health Spa
Restaurant
Place for outdoor activity
Summer Cycling/Tour Organization
Optional
(If you have a website that you wish to create for a business or non-profit organization), a detailed description MUST be completed for approval. Sorry, family type websites' are NOT permitted. Must be of business type nature.

Recommendations for Getting Started!

First read…

This **entire project description over again** to make that you understand the overall **purpose** of the project so that you get off on the RIGHT foot.

Before you create any documents, create a folder on your hard drive called:
"Project".

Download the "**Project Outline**" form from the "Projects" section on Blackboard and begin to outline your project topic, description, objectives, and your timelines and how to get you to the Project Timelines in this "1st Draft". Also include your first thoughts about the project, what you will be attempting to do, and how you will do it.

After you complete the 1st Draft, print out a hard copy, look for missing items, it must be complete; make edits and necessary changes that get you closer to your final version.

Finalize your Project Outline and upload it to the "Project" folder on the student website by its DUE date.
Finally, DO NOT WASTE ANY TIME! **Remember**, there are no other assignment requirements during this project, so it is your responsibility to determine how much time will be needed to complete tasks early. Begin development!

Project Timelines

There must be constant development of your website, week by week. It is expected that major changes and additions completed and uploaded to your student website by their due dates outlined below. NOTE: Not meeting the following Timelines will have a negative effect in the TIMELINES category of the Rubric.

- ❖ Monday of Week 11 … You MUST have completed your "Project Outline" for your website and uploaded it to the student website "project" folder. Make sure by now that you have a solid idea as to how you will be developing your website project. You should have basic timelines in place as to when/how you plan to meet various stages of development.
- ❖ Monday of Week 13 … Project MUST be well under way. A home page (default.htm) and at least two supporting pages must have completed the first phase of construction and uploaded to the "projects" folder on the student website.
- ❖ Monday of Week 15 … Website complete and uploaded to the student website.

Grading Rubric for this Project

Grading Code for the following Skills Category:

❍ Less than 50% was completed ❶ Met requirements by 50-59% ❷ Met requirements by 60-69%
❸ Met requirements by 70-79% ❹ Met requirements by 80-89% ❺ Met requirements by 90-100%

COMPUTER SKILLS *(85% Overall Value)*

Applying Computer Skills: *(Each ☑ is valued at .354 points)*	**Actual**	**Max**	**Total**
Student remained creative when developing project material		17.0	
Student remained committed to project deadlines			
Student created a consistent design, layout, and color scheme			
Student created complex style sheet(s) to control entire website			
Student used cascading style sheets to control entire website design			
Website images were consistent with theme and consistently sized			
Website navigation consistent throughout site for easy of viewing			
Student developed quality material and met ALL specifications			

Grading Code for the following Timelines Category:

❍ Student DID NOT meet requirements ❶ Student met ALL requirements

TIMELINES *(15% Overall Value)*

Due Dates: *(Each ☑ is valued at .2 points)*	**Actual**	**Max**	**Total**
ALL materials were submitted to specification by 1st deadline		3.0	
ALL materials were submitted to specification by 2nd deadline			
ALL materials were submitted to specification by FINAL deadline			
Total Overall Project Points:			

Project Outline – ITC 125	
Student Name & Date	

Project Selection

For my website project, I have selected the topic of choice by placing ☒ in the box from the list of items below:

☐	Museum	☐	Art Gallery
☐	SPA and Resort	☐	Summer Resort
☐	Restaurant	☐	Place for outdoor activity
☐	Summer Cycling/Tour Organization	☐	Optional

E: *A detailed description is outlined for approval of optional project. Please see outline below.*

Optional Project

Description:

Web Development Phase:
Questions to be Answered before you begin to develop your site. This section must be completed as part of the project description by date described in the milestones.

Planning Phase	
What is the purpose of this Website?	Description:

What forms of graphics will be on the Website?	Description:
What information will go on the Website?	Description:
Analysis Phase	
Who is your target audience is -- for instance, what's the age, gender, income level, etc.?	Description:
What information will be useful to the users to get from your Website?	Description:
Design & Development Phase	
The tasks that will be performed over the next four weeks are outlined below. **NOTE**: This outline provides an overview of all necessary tasks that must be performed from the beginning of the project to the end of the project.	
Week 1: (Specific Tasks for this week are outlined right panel.)	Tasks:
Week 2: (Specific Tasks for this week are outlined in the right panel.)	Tasks:
Week 3: (Specific Tasks for this week are outlined in the right panel.)	Tasks:

Week 4: (Specific Tasks for this week are outlined in the right panel.)	Tasks:
Week 5: (Specific Tasks for this week are outlined in the right panel.)	Tasks:

Appendix G

MCC Institutional Student Learning Outcomes

Knowledge and Skills
The MCC graduate will use knowledge acquired at MCC as a foundation for continued study and/or practical application.

- Freshman and sophomore foundation for transfer
- Professional skills for career track (degree or certificate)

Critical Thinking (2008-09, 2011-12, 2014-15)
The MCC graduate will demonstrate an ability to understand, interpret and analyze information in order to engage in critical thinking and problem-solving.

- Knowledge Acquisition, Comprehension, Application, Analysis, Synthesis, and Evaluation
- Quantitative and Scientific Reasoning
- Knowledge Integration, Reasoning, and Problem-Solving Across Disciplines

Communication (2009-10, 2012-13)
The MCC graduate will communicate, use information and employ technology effectively.

- Effective Written, Presentation and Numeracy Skills, AND
- Information Literacy and Technology Fluency

Global Perspectives (2008-09, 2011-12, 2014-15)
The MCC graduate will communicate an understanding of the world from a global perspective.

- Historical, Political, Economic and Social
- Scientific and Environmental
- Aesthetic Appreciation and Creativity

Social Responsibility (2010-11, 2013-14)
The MCC graduate will demonstrate social responsibility both within and outside of the classroom.

- Multicultural and Diversity Awareness
- Ethics, Values, and Social Justice
- Citizenship and Civic Engagement

Personal and Professional Development (2010-11, 2013-14)
The MCC graduate will demonstrate the capacity for on-going personal and professional development.

- Independent and Life-long Learning
- Professionalism and Accountability
- Collaboration
- Managing Responsibilities and Adapting to Change
- Initiative and Self-Advocacy
- Self Assessment

Appendix H

Data from Institutional Research Office

Updated%20ITWD%20Final%202007.pdf

Copy%20of%20ProgramReviewGradsCo

ITGrads2004-2008.xls

SurveySummary_alumni.pdf

SurveySummary_Current.pdf