Division of Mathematics, Science & Technology

Mathematics Department PROGRAM REVIEW 2016

A PROCESS FOR
SELF-EVALUATION
AND
CONTINUOUS IMPROVEMENT

CONTENT

Program Review Team …….. 3

Overview …… 4

Summary of significant developments since the last program review ……..…5 - 8

Focus on Students ……9 - 30

Focus on Faculty and Staff ……..……..…….31 - 34

Focus on Curriculum ……..35 - 40

Focus on Support ……41 - 44

Focus on Community ……...…..45

Mathematics at the Meadowlands ……..…46 - 62

Summary ……63 - 64

Action Plan ……..….65 - 66

Appendix: Associate of Science Degree in Mathematics – Curriculum……67

External Program Reviewer's CV ……..…68 - 70

External Program Reviewer's Report …….71 - 76

.
.

PROGRAM: ASSOCIATE IN SCIENCE IN MATHEMATICS

PROGRAM REVIEW TEAM

Dr. Randolph Forsstrom, Mathematics Department Chair, Program Review Chair

Professor Keri Cerami, Developmental Mathematics

Professor Lenore Lerer, Mathematics Coordinator – College Level Mathematics

Professor Tracy Saltwick, College Level Mathematics

Professor Kaveh Saminejad, College Level Mathematics

Professor Melanie Walker, Developmental Mathematics

Dr. P.J. Ricatto, Dean, Division of Mathematics, Science, and Technology

Dr. William Mullaney, Vice-President of Academic Affairs

Dr. Maria DeLucia, Middlesex County College, External Program Evaluator

DATE OF THIS REPORT: June 15, 2016

PERIOD OF YEARS BEING REVIEWED: 2011 – 2016

OVERVIEW

The Associate in Science Degree in Mathematics is a curriculum designed to allow students to transfer to a four-year program in mathematics or a related area such as statistics or actuarial science. The program consists of thirty general education credits (including a two semester sequence in Physics, Chemistry, or Biology), nine program support credits, and includes the required courses of Calculus I, II, III, Differential Equations, and Linear Algebra, as well as elective courses in Discrete Mathematics, Statistical Methods, and Computer Science. This program is recommended for students interested in working towards a baccalaureate degree in mathematics or related areas of study. Graduates of this program have successfully transferred to college is New Jersey and across the nation.

The mission of the Mathematics Discipline is to promote excellence in the teaching and learning of mathematics by:

- offering a broad selection of courses that are designed to meet diverse student needs.

- providing students with an awareness of the connections of mathematics to other subjects and to strengthen each student's ability to apply mathematics to these subjects.

- promoting critical thinking through course work that emphasizes problem solving and applications.

- introducting students to the effective uses of technology in mathematical problem solving.

- promoting scholarly activity among all of the mathematics faculty and students majoring in mathematics.

- encouraging and supporting faculty collaboration with colleagues from other disciplines to modify and develop mathematics courses that support other programs of study.

The Mathematics discipline serves a diverse population that includes students:

- who are majoring in mathematics in order to pursue a career in teaching or in the private sector.

- from other majors who need to acquire mathematical skills in order to be successful in their major

- who, as part of their general education, need to acquire the ability to think critically, reason logically, communicate mathematical information, and do problem solving in a systematic manner in order to become more productive citizens.

SUMMARY OF SIGNIFICANT DEVELOPMENTS

SINCE THE LAST PROGRAM REVIEW

STEM-GPS Grant

The STEM-GPS grant, funded by the U.S. Department of Education, now in its fifth and final year has allowed us to undertake programs and activities that enrich the experience of our students and support student success. Under the STEM grant, a Math-Science Walk-in Center has been established which provides tutoring for students in STEM courses. Dr. Ruth Feigenbaum and Professor Kaat Higham have served as mathematics liaissons to the Cerullo Learning Assistance Center (CLAC).The grant has also allowed us to provide boot camps and prep courses to students in January and August of each year.

B2B Grant

The Bridges to the Baccalaureate (B2B) grant funded by NSF provides stipends for community college students from underrepresented populations for books and other supplies to support them as they work toward transfer to a four year institution and a baccalaureate degree.

Math Hub

Under a Title V grant we were able to establlish a Math Hub for Developmental Math courses and implement self-paced courses across the curriculum.

Assessment in Mathematics

One of the program learning goals the Mathematics Program is as follows:

> Understand the fundamental concepts of functions and relations, be able to work with function notation, and understand how functions are used to represent real-world applications.

In order to assess whether the mathematics program is meeting that goal, the assessment committee selected four questions from the MAT 160 Intermediate Algebra final examination and examined student results from two consecutive semesters. As a result of this study, the assessment committee identified three areas of weakness (as detailed in the assessment report which is contained in the program review) but the most problematic area was finding the inverse of a function.

The mathematics faculty will continue to explore ways to improve student performance and mastery of material in the mathematics courses. Some of the suggestions are detailed in the assessment report in the mathematics program review.

First In the World Grant

This is a federally funded study that seeks to identify effective alternatives to traditional remedial mathematics courses that will allow students who place into developmental mathematics the opportunity to potentially complete a developmental and college-level mathematics course in their first semester. There are three student groups in the study.

Pathway Group 1: Students will complete the required mathematics courses that are currently required for BCC students. (The Control Group)

Pathway Group 2: The accelerated traditional lecture based pathway is taught in a traditional lecture class format - the accelerated 7.5 week MAT 040 Algebra for Liberal Arts course, directly followed by an accelerated 7.5-week MAT 130 Contemporary Mathematics course.

Pathway Group 3: The accelerated self-paced pathway is the same as Pathway 2, however, instead of the courses being taught in a traditional lecture class format, students will be taught in a computer-based self-paced format in the state-of-the-art Math Hub (TEC 114).

Gateways to Completion – MAT-130 Contemporary Mathematics

The committee for the MAT-130 Gateways to completion used the G2C platform to respond to a series of questions under six key performance indicators (KPIs). There were respectively: 1) Academic Policy and Practice, 2) Faculty / Instructor, 3) Learning, 4) Improvement, 5) Student, 6) Support. The goal was to identify how evidence-based documents contribute to students' success at the institution. Besides experience-based feedback, we provided documentation at the departmental as well as institutional levels. Sources such as Institutional Research Reports, Factbook, the College Catalog, etc. were used to collect the evidence.

All committee members have extensive experiences teaching MAT-130. Accordingly, our recommendations reflected our classroom experiences in conjunction with the evidence based data revealed in the KPIs. Recommendations were presented based on a comprehensive review of the MAT-130 KPIs, course level report, and the evidence library available on the G2C platform.

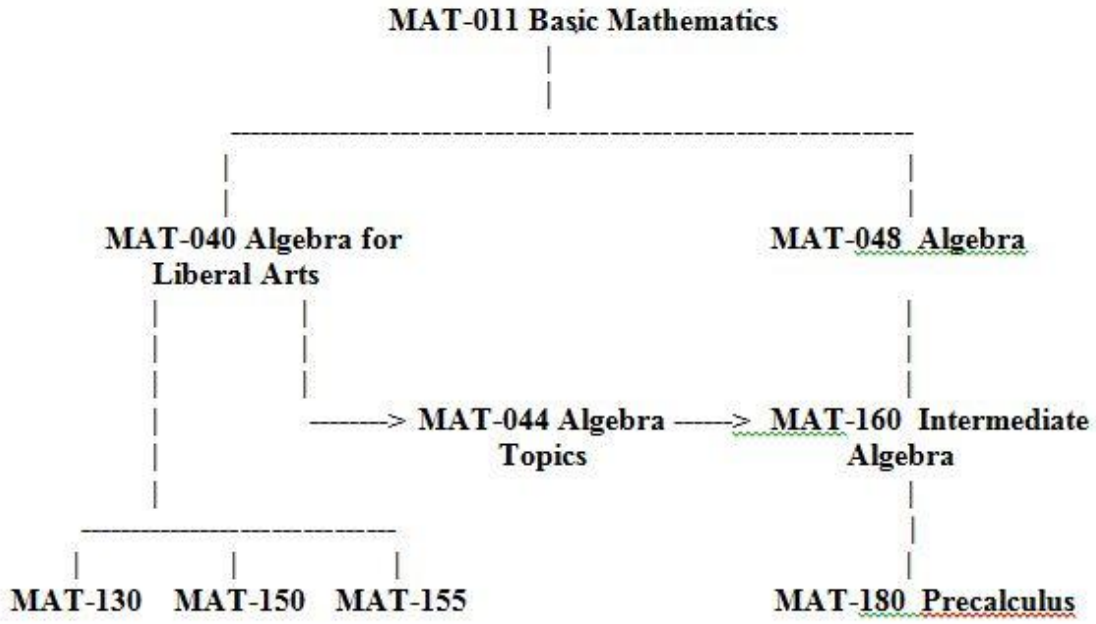
Expansion of Honors work opportunities in mathematics

In addition to the honors class sections in MAT-130 Contempoary Mathematics and MAT-150 Statistics I that are given each year, the Mathematics Department has expanded the opportunities for qualified students to pursue honors work through an Honors by Contract (HBC) arrangement. Participation in an HBC arrangement can be used by the student for credits towards an Honors Diploma and, since the course will have an honors designation on their transcript, it will enhance the students eventual application to transfer to a four-year school.

The HBC arrangement is available to qualified students for MAT-155 Finite Mathematics, MAT-250 Statistics II, MAT-268 Statistical Methods, MAT-280 Calculus I, MAT-281 Calculus II, MAT-282 Calculus III, MAT-283 Differential Equations, MAT-285 Discrete Mathematics, and MAT-286 Linear Algebra.

Significant Developmental Mathematics Initiatives and Course Offerings

1. For students needing extra support based on their Accuplacer test score of 20-29, students register for MAT-011 with a linked support MAT-010.
2. For students who are able to accelerate, based on their Accuplacer test score of 60-76, students register for Mat 012, a one credit accelerated 7 1/2 week arithmetic course. At the completion of this course students can register for a late start algebra course if that is their placement. This accelerated program allows students to complete their developmental coursework in one semester.
3. Using the Emporium Model of Course Re-design we created our guided self-paced mathematics classes located in our Mathematics Hub in Tec-114 and Tec-117 which is has 78 computers. These courses were built online and allow the students to progress at their own pace. They require a pre-set mastery for each topic before being able to move on to the next topic. Students are allowed to accelerate and complete up to two courses in one semester. Students can use our annex in Tec114A for tutoring purposes and our testing center in Tec-117 to take an exam outside of class.
4. Further assessment of pass rate and attrition rates resulted in the implementation of two path career initiative which took place in the Fall of 2014. The developmental mathematics faculty in conjunction with the college level mathematics faculty have redesigned the developmental algebra courses according to a students' major. This will create a separate pathway for students taking General Education Mathematics (130, 150, 155) vs. students taking Mat 160. After reviewing the curriculum of the old algebra courses (MAT- 031, 032, 035) offered in the developmental mathematics it was determined by the faculty that there is a need for two algebra pathways depending on a student's major. It was determined that students going into the general education math courses (MAT-130, 150, or 155) do not need as rigorous a course as the students going into MAT-160. The college level and developmental faculty collaboratively created a new course structure and ultimately a new path for liberal arts students vs. stem or business students.



MAT 040 is an algebra course for students whose program of study does not require the completion of MAT 160 Intermediate Algebra and whose placement score indicates a need for a review of basic algebra.

MAT 044 Algebra Topics is an algebra course for students who have completed MAT 040 and whose program of study requires the completion of MAT 160 – Intermediate Algebra.

MAT 048 Algebra is a basic algebra course for students whose placement examination indicates a need for review in algebra and whose program of study requires the completion of MAT 160 – Intermediate Algebra.

Although the redesign has only been underway for the past four semesters, the data is promising. In the Fall of 2015 students who took Mat 160 after taking Mat 048 had a pass rate of 65.4% vs students who took Mat 160 that did not remediation had a pass rate of 58.2%.

FOCUS ON STUDENTS

Student Demographics -Developmental Mathematics

When looking at the student body of the Developmental Mathematics classes, many demographics should be observed. Tables 1a-d show enrollment patterns of students in the Developmental Mathematics classes starting with Fall 2014 through Fall of 2015. Total students for each course were obtained as well as a breakdown of students who registered for Self-Paced (T- Sections) and Traditional Courses (Non T-Sections).

Table 1a: Enrollment MAT-011

MAT-011	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	936	454	1390
Spring 2015	446	234	680
Fall 2015	813	461	1274
All Semesters	**2,195**	**1,149**	**3,344**

Table 1b: Enrollment MAT-012

MAT-012	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	241	0	241
Spring 2015	151	0	151
Fall 2015	268	0	268
All Semesters	**660**	**0**	**660**

Table 1c: Enrollment MAT-032

MAT-032	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	249	280	529
Spring 2015	79	67	146
Fall 2015	0	0	0
All Semesters	**328**	**347**	**675**

Table 1d: Enrollment MAT-040

MAT-040	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	682	165	847
Spring 2015	646	211	857
Fall 2015	572	203	775
All Semesters	**1900**	**579**	**2479**

Table 1e: Enrollment MAT-044

MAT-044	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	0	0	0
Spring 2015	0	5	5
Fall 2015	0	5	5
All Semesters	**0**	**10**	**10**

Table 1f: Enrollment MAT-048

MAT-048	Non T-Sections	T-Sections	Total
	Enrolled	Enrolled	Enrolled
Fall 2014	133	74	207
Spring 2015	178	80	258
Fall 2015	169	98	267
All Semesters	**480**	**252**	**732**

Overall enrollment patterns of students show that our two most popular courses in the Developmental Mathematics courses are MAT-011 (Basic Math) and MAT-040 (Algebra for liberal arts). MAT-011 consistently has the highest enrollment in the DMAT classes for the fall semesters and MAT-040 for spring semesters. Non T-Sections (Traditional courses taught with a lecture style vs. self-paced computer courses) have the highest enrollment for all semesters shown. Mat 012 ia a 7 ½ week accelerated basic arithmetic course which is not offered in a T section.

In the Fall of 2014 the Mathematics Department redesigned our algebra courses to offer a one semester sequence depending on a student's major. Students take Mat 040 (Algebra for Liberal Arts) if they are taking a general education mathematics course such as Mat 130, Mat 150 or Mat 155. Students take Mat 048 (Algebra) if they are taking Mat 160. In the past the mathematics department had a two semester sequence, Mat 031 followed by Mat 032. As table 1c demonstrates enrollment for Mat 032 is quite low as we phase it out completely in the Fall of 2015. As table 1e demonstrates enrollment in Mat 044 is quite low. This is to be expected since Mat 044 was designed as a bridge course for students who changed their major and need to take Mat 160 after completing Mat 040. There is also a significantly higher enrollment in Mat 040 than Mat 048. This demonstrates that fewer students are going into the STEM majors.

Table 2a shows the enrollment of total students in Developmental Math Courses based on Race/Ethnicity for each of the four previous semesters (Fall 2014-Fall 2015).

Table 2a: Race/Ethnicity Demographics

	Non T-Sections	T-Sections	Total	Percent of Total to Enrolled
	Enrolled	Enrolled	Enrolled	%
Fall 2014				
Am. Indian/Alaska Native	6	2	8	<1%
Asian	65	37	102	3.4%
Black/African American	187	90	277	9.3%
Hispanic, all races	577	312	889	29.9%
Hawaiian/Pacific Islander	7	2	9	<1%
Two or more races	30	17	47	1.6%
White	645	297	942	31.7%
Unknown Race/Ethnicity	483	213	696	23.4%
TOTAL	**2,000**	**970**	**2,970**	**100%**
Spring 2015				
Am. Indian/Alaska Native	2	0	2	<1%
Asian	43	25	68	3.5%
Black/African American	120	52	172	8.8%
Hispanic, all races	413	198	611	31.4%
Hawaiian/Pacific Islander	4	2	6	<1%
Two or more races	20	6	26	1.3%
White	424	180	604	31.0%
Unknown Race/Ethnicity	325	132	457	23.5%
TOTAL	**1,351**	**595**	**1,946**	**100%**
Fall 2015				
Am. Indian/Alaska Native	6	1	7	<1%
Asian	40	30	70	2.9%
Black/African American	140	70	210	8.7%

Hispanic, all races	507	247	754	31.3%
Hawaiian/Pacific Islander	4	2	6	<1%
Two or more races	18	8	26	1.1%
White	601	200	801	33.2%
Unknown Race/Ethnicity	333	204	537	22.3%
TOTAL	**1,649**	**762**	**2,411**	**100%**

Enrollment for the Developmental Mathematics Department shows a diverse student body is being represented. In DMAT courses, for the last three semesters, the most represented race/ethnicity were students who identified themselves as white. The percentage of students who identified themselves as white ranged from 31%-33.2% for the last three semesters. For each semester, the second most represented race/ethnicity were students who identified themselves as Hispanic, all races (a range of 29.9-31.4% of DMAT population). The third most enrolled race/ethnicity were those that identified themselves as Unknown (range of 22.3-23.5% for all three semesters). Students who identified themselves as Black/African American were the fourth most enrolled with percentage of enrollees varying from 8.7-9.3% for the three semesters.

Table 2b shows the enrollment of students at Bergen Community College based by Race/Ethnicity for Fall 2014.

2b: Enrollment by Race/Ethnicity

	White	Black	Hispanic	Asian*
	Enrolled %	Enrolled %	Enrolled %	Enrolled %
Total	5,826 34.2%	1,011 5.9%	4,142 24.3%	1,238 7.3%

	American Indian	Non-Resident Alien	Race Unknown*	Total
	Enrolled %	Enrolled %	Enrolled %	Enrolled %
Total	25 0.1%	1,228 7.2%	3,545 20.8%	17,015 100%

* Note: Asian includes Pacific Islanders and Unknown includes 2 or More Races.
Source: IPEDS Fall Enrollment Survey

The student body based on ethnicity/race of the DMAT program compares to the overall population of Bergen Community College. While percentages varied slightly, each representation of each race was consistent by each race/ethnicity. The only exception being that students identifying themselves as Asian represent 7.3% of the entire school body, while only composing of 3.4% of the DMAT population.

Table 2c Shows the demographics of students enrolled in Developmental Mathematics Courses at Bergen Community College based on age by semester. The three previous semesters (Fall 2014-Fall 2015) are shown.

Table 2c: Student Demographics Based on Age

	Non T-Sections Enrolled	T-Sections Enrolled	Total	Percentage of study body
Fall 2014				
Up to 21 years	1385	758	2143	73.9%
22-24 years	239	92	331	11.4%
25-34 years	239	74	313	10.8%
35 and older	91	23	114	3.9%
TOTAL	**1954**	**947**	**2901**	**100%**
Spring 2015				
Up to 21 years	951	447	1398	72.2%
22-24 years	158	70	228	11.8%
25-34 years	166	63	229	11.8%
35 and older	69	12	81	4.2%
TOTAL	**1344**	**592**	**1936**	**100%**
ll 2015				
Up to 21 years	1127	579	1706	75.5%
22-24 years	177	63	240	10.6%
25-34 years	144	65	209	9.2%
35 and older	75	30	105	4.6%
TOTAL	**1523**	**737**	**2260**	**100%**

For all semesters shown, the most represented group of students is those who are 21 years and under. The least represented group is students who are 35 and older.

Learning Outcomes Assessments
Developmental Mathematics

Each course offered by the Developmental Mathematics Program (MAT011, MAT012, MAT040, MAT 044, and Mat 048) has a department made final which is given to each student taking the course. Each semester, a committee reviews each final and makes corrections to ensure students are being challenged and tested on objectives of the course. The final exam accounts for 25 % of each student's overall grade. Students also must meet a minimum grade on the final in order to pass the class. Students in traditional courses must receive at least a 55% on the final exam and students in Self-Paced (T) sections must receive at least a 60% on the final exam. In addition, all students must receive an overall average of at least 70% in the class.

Assessment for student learning within the department is obtained through studies based on three objectives shown on the final. For the complete analysis of the assessment report, please see the attached assessment report at the end of this section.

Student Success

Student Success for our department can be measured by pass rates in classes as well as pass rates in college courses after the completion of DMAT courses.

MAT-012 is an accelerated 7 ½ week basic arithmetic course for students that have placement exam scores very close to the cutoff point for MAT-011.

Table 7 shows the number of students who enrolled in MAT-012 and the number of students who passed MAT-012 for the previous three semesters (Fall 2014– Fall 2015). Students who received a letter grade ranging from A to C were considered to have passed the course.

Table 7: Pass Rates, MAT-012

Term	Enrolled	Passed	Pass Rate
Fall 2014	241	186	77.2%
Spring 2015	151	81	53.6%
Fall 2015	268	180	67.2%
All Semesters	**660**	**447**	**67.7%**

MAT012 pass rates range from 53.6%-77.2% for the last three semesters. MAT-012 is a good option for students who would like to finish their DMAT courses quickly.

Tables 8a – 8d show how many students enrolled in and passed MAT-011, MAT-032, MAT-040, MAT-044 and MAT 048 in each of the three previous semesters (Fall 2014 – Fall 2015). Students who received a letter grade ranging from A to C were considered to have passed the course.

Table 8a: Pass Rates MAT-011

MAT-011	Non T-Sections			T-Sections		
	Enrolled	Passed	Pass Rate	Enrolled	Passed	Pass Rate
Fall 2014	936	570	60.9%	454	285	62.8%
Spring 2015	446	254	57.0%	234	142	60.7%
Fall 2015	813	522	64.2%	461	279	60.5%
All Semesters	**2195**	**1346**	**61.3%**	**1149**	**706**	**61.4%**

Table 8b: Pass Rates MAT-032

MAT-032	Non T-Sections			T-Sections		
	Enrolled	Passed	Pass Rate	Enrolled	Passed	Pass Rate
Fall 2014	249	137	55.0%	79	46	58.2%
Spring 2015	280	169	60.4%	67	38	56.7%
Fall 2015	-	-	-	-	-	-
All Semesters	**529**	**306**	**57.8%**	**146**	**84**	**57.5%**

Table 8c: Pass Rates MAT-040

MAT-040	Non T-Sections			T-Sections		
	Enrolled	Passed	Pass Rate	Enrolled	Passed	Pass Rate
Fall 2014	682	454	66.6%	165	96	58.2%
Spring 2015	646	395	61.1%	211	148	70.1%
Fall 2015	572	365	63.8%	203	122	60.1%
All Semesters	**1900**	**1214**	**63.9%**	**579**	**366**	**63.2%**

Table 8d: Pass Rates MAT-044

MAT-044	Non T-Sections			T-Sections		
	Enrolled	Passed	Pass Rate	Enrolled	Passed	Pass Rate
Fall 2014	-	-	-	-	-	-
Spring 2015	-	-	-	5	3	60.0%
Fall 2015	5	2	40.0%	-	-	-
All Semesters	**5**	**2**	**40%**	**5**	**3**	**60%**

Table 8e: Pass Rates MAT-048

MAT-048	Non T-Sections			T-Sections		
	Enrolled	Passed	Pass Rate	Enrolled	Passed	Pass Rate
Fall 2014	133	70	52.6%	74	36	48.6%
Spring 2015	178	89	50.0%	80	43	53.8%
Fall 2015	169	94	55.6%	98	59	60.2%
All Semesters	**480**	**253**	**52.7%**	**252**	**138**	**54.8%**

After taking DMAT courses at Bergen Community College, many students are required to take college level courses for their degree. The DMAT faculty is responsible for preparing students for their college level courses to help them be successful.

Tables 9a – 9b show the pass rates for MAT 160 (Spring 2015 – Fall 2015) based on the students' enrollment in MAT 048/MAT 044 vs students who did not take MAT 048/MAT 044 Students who received a letter grade ranging from A to D were considered to have passed the college course. Students who audited the college level math course or received an incomplete in the course were not counted in the enrollment numbers.

Pass Rates, MAT-160 in Spring 2015	Took MAT-044/MAT-048		Did Not Take MAT-044/MAT-048	
	#	%	#	%
Passed	29	53.7%	281	59.7%
Failed/Withdrew	25	46.3%	190	40.3%
TOTAL	**54**	**100.0%**	**471**	**100.0%**

Pass Rates, MAT-160 in Fall 2015	Took MAT-044/MAT-048		Did Not Take MAT-044/MAT-048	
	#	%	#	%
Passed	53	65.4%	296	58.2%
Failed/Withdrew	28	34.6%	213	41.8%
TOTAL	**81**	**100.0%**	**509**	**100.0%**

As stated earlier in the report the Mathematics Department redesigned our algebra courses in Fall 2104. One of the main reasons was to help better prepare students going into MAT 160. Since we separated the two algebra courses we were able to create a more rigorous developmental algebra course for students going into the pre-calculus track and beyond. Although it has only been two semesters that we are able to assess our new courses the data is promising. In the Fall of 2015 students who took MAT 048 did 7.2% better in MAT 160 than students who tested out of developmental mathematics. The Mathematics Department will continue to tweak our new courses to help improve our students for their college level course work.

Student Demographics - College Level Mathematics

The tables that follow in this section contain demographic information about the students who have taken college level mathematics courses within the past two years. The data indicate that the number of students taking a college level mathematics course each Fall and Spring semester is consistently just over three thousand students per semester. When the students taking developmental mathematics courses are added into these totals, it indicates that

Overall enrollment with Pass Rates

The overall enrollment tables show that the number of student enrollments have remained fairly consistent during the past two years (Fall to Fall and Spring to Spring) for the following categories: (a) the general education mathematics elective courses of MAT-130 Contemporary Mathematics, MAT-150 Statistics I, and MAT-155 Finite Mathematics, (b) MAT-160 Intermediate Algebra, and (c) all other college level mathematics courses (including the Calculus sequence and elective courses that have a Calculus prerequisite):

	Category (a)	Category (b)	Category (c)	Total
Fall 2014	1,895	580	744	3,219
Fall 2015	1,802	590	716	3.108
Spring, 2015	1,785	525	861	3,171
Spring, 2016	1,842	551	848	3,241

The overall data also indicate that:

MAT-130 Contemporary Mathematics is one of the most popular general education mathematics elective courses, accounting for approximately 25% of student enrollments in College level mathematics courses. This course is currently being reviewed thru the Gateways to Completion (G2C) project and is also one of the two component courses in the First In The World Grant initiative for accelerated completion of mathematics requirements that will begin during the Fall, 2016 semester.

MAT-160 Intermediate Algebra has the lowest passing rate of all of the College level mathematics courses. This course has been the focus of the two year assessment project which has been conducted by the mathematics faculty and which was just completed during the Spring, 2016 semester. The results of this assessment study will be reviewed in order to determine what, if any, modifications should be made to this course. This course was also one of the primary reasons why a complete redesign of the developmental algebra courses was completed and it is hoped that as students now begin to enter MAT-160 having completed the new, more rigorous MAT-048 Algebra course that the pass rate in the MAT-160 course will improve significantly.

CMAT Course	Fall 2014			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	833	628	75.4%	83.0%
MAT-150	981	680	69.3%	79.1%
MAT-155	81	47	58.0%	74.6%
MAT-160	580	326	56.2%	65.2%
MAT-180	308	188	61.0%	72.6%
MAT-223	32	27	84.4%	96.4%
MAT-250	19	15	78.9%	93.8%
MAT-268	6	5	83.3%	83.3%
MAT-280	199	132	66.3%	81.5%
MAT-281	69	44	63.8%	77.2%
MAT-282	68	52	76.5%	82.5%
MAT-283	26	20	76.9%	80.0%
MAT-285	17	12	70.6%	75.0%
MAT-286	-	-	-	-

CMAT Course	Spring 2015			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	731	541	74.0%	83.7%
MAT-150	986	673	68.3%	83.0%
MAT-155	68	38	55.9%	65.5%
MAT-160	525	310	59.0%	72.3%
MAT-180	388	248	63.9%	80.3%
MAT-223	50	42	84.0%	93.3%
MAT-250	16	12	75.0%	92.3%
MAT-268	8	8	100.0%	100.0%
MAT-280	203	101	49.8%	76.5%
MAT-281	97	62	63.9%	82.7%
MAT-282	33	24	72.7%	82.8%
MAT-283	35	33	94.3%	97.1%
MAT-285	-	-	-	-
MAT-286	31	24	77.4%	100.0%

CMAT Course	Fall 2015			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	771	560	72.6%	85.0%
MAT-150	954	634	66.5%	82.4%
MAT-155	77	38	49.4%	73.1%
MAT-160	590	349	59.2%	74.4%
MAT-180	298	175	58.7%	73.8%
MAT-223	31	26	83.9%	92.9%
MAT-250	20	16	80.0%	88.9%
MAT-268	4	3	75.0%	75.0%
MAT-280	208	131	63.0%	82.4%
MAT-281	69	44	63.8%	80.0%
MAT-282	63	43	68.3%	76.8%
MAT-283	10	9	90.0%	100.0%
MAT-285	13	13	100.0%	100.0%
MAT-286	-	-	-	-

Enrollment by Age

An examination of the pass rates in college level mathematics courses with regard to age category shows that:

approximately 64% of the total enrollments are for students who are 21 years old or younger and that approximately 82% of the enrollments are for students who are 24 years old or younger.

There is no significant difference in the overall pass rates for the following two broad categories of students: (a) 24 years old or younger, (b) 25 years old or older.

Although representing only approximately 4% of the total enrollments, the category of students who are 35 years old or older, clearly have a much better overall pass rate than the students who are younger than 35 years old. This is most likely due to the fact that the older students are more focused on their intended goal.

CMAT Course	Fall 2015					
	Under 18 years old	18 - 21 years old	22 - 24 years old	25 - 34 years old	35 or older	Total Enrolled
MAT-130	6	532	132	74	27	771
MAT-150	11	563	174	153	53	954
MAT-155	2	49	14	11	1	77
MAT-160	15	393	87	70	25	590
MAT-180	3	179	55	50	11	298
MAT-223	-	16	5	8	2	31
MAT-250	-	14	4	2	-	20
MAT-268	-	1	2	1	-	4
MAT-280	1	124	39	33	11	208
MAT-281	2	46	10	8	3	69
MAT-282	-	33	19	8	3	63
MAT-283	-	2	5	1	2	10
MAT-285	-	6	6	-	1	13
MAT-286	-	-	-	-	-	-

Pass Rates by Age

Fall 2015	Under 18 years old				18 - 21 years old			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	6	5	83.3%	83.3%	532	379	71.2%	84.8%
MAT-150	11	8	72.7%	72.7%	563	388	68.9%	84.2%
MAT-155	2	2	100.0%	100.0%	49	19	38.8%	65.5%
MAT-160	15	10	66.7%	76.9%	393	230	58.5%	74.4%
MAT-180	3	2	66.7%	100.0%	179	115	64.2%	78.8%
MAT-223	-	-	-	-	16	14	87.5%	93.3%
MAT-250	-	-	-	-	14	11	78.6%	91.7%
MAT-268	-	-	-	-	1	0	0.0%	0.0%
MAT-280	1	1	100.0%	100.0%	124	81	65.3%	83.5%
MAT-281	2	1	50.0%	50.0%	46	27	58.7%	75.0%
MAT-282	-	-	-	-	33	25	75.8%	89.3%
MAT-283	-	-	-	-	2	2	100.0%	100.0%
MAT-285	-	-	-	-	6	6	100.0%	100.0%
MAT-286	-	-	-	-	-	-	-	-

Fall 2015	22 - 24 years old				25 - 34 years old			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	132	100	75.8%	84.0%	74	54	73.0%	88.5%
MAT-150	174	115	66.1%	81.0%	153	93	60.8%	77.5%
MAT-155	14	8	57.1%	88.9%	11	8	72.7%	72.7%
MAT-160	87	52	59.8%	69.3%	70	42	60.0%	79.2%
MAT-180	55	26	47.3%	61.9%	50	26	52.0%	66.7%
MAT-223	5	5	100.0%	100.0%	8	6	75.0%	85.7%
MAT-250	4	3	75.0%	75.0%	2	2	100.0%	100.0%
MAT-268	2	2	100.0%	100.0%	1	1	100.0%	100.0%
MAT-280	39	23	59.0%	74.2%	33	18	54.5%	81.8%
MAT-281	10	7	70.0%	100.0%	8	6	75.0%	85.7%
MAT-282	19	11	57.9%	64.7%	8	4	50.0%	50.0%
MAT-283	5	4	80.0%	100.0%	1	1	100.0%	100.0%
MAT-285	6	6	100.0%	100.0%	-	-	-	-
MAT-286	-	-	-	-	-	-	-	-

CMAT Fall 2015	35 or older			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	27	22	81.5%	84.6%
MAT-150	53	30	56.6%	85.7%
MAT-155	1	1	100.0%	100.0%
MAT-160	25	15	60.0%	78.9%
MAT-180	11	6	54.5%	75.0%
MAT-223	2	1	50.0%	100.0%
MAT-250	-	-	-	-
MAT-268	-	-	-	-
MAT-280	11	8	72.7%	100.0%
MAT-281	3	3	100.0%	100.0%
MAT-282	3	3	100.0%	100.0%
MAT-283	2	2	100.0%	100.0%
MAT-285	1	1	100.0%	100.0%
MAT-286	-	-	-	-

Enrollment and Pass Rates by Race and Ethnicity

With regard to total enrollment in college level mathematics courses categorized by ethnicity the data indicate a diverse student body and that the largest categories of enrollment are holding steady at about: (a) white, 30%, (b) Hispanic, 25%, (c) Asian, 12%, (d) Black / African American, 7%. These percentages are reasonably consistent with the corresponding percentages for the overall student population of Bergen Community College. Unfortunately, the data for each year also include the category of "Unknown Race / Ethnicity" and this category accounts for approximately 20% of the total enrollment; consequently, the percentages in each of the previously listed categories could have a fairly large margin of error.

Fall 2015	American Indian/Alaska Native				Asian			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	-	-	-	-	39	33	84.6%	94.3%
MAT-150	3	2	66.7%	66.7%	111	85	76.6%	89.5%
MAT-155	-	-	-	-	8	5	62.5%	83.3%
MAT-160	3	0	0.0%	0.0%	64	48	75.0%	82.8%
MAT-180	1	1	100.0%	100.0%	38	23	60.5%	76.7%
MAT-223	-	-	-	-	3	3	100.0%	100.0%
MAT-250	-	-	-	-	5	3	60.0%	75.0%
MAT-268	-	-	-	-	4	3	75.0%	75.0%
MAT-280	1	1	100.0%	100.0%	37	27	73.0%	96.4%
MAT-281	-	-	-	-	18	12	66.7%	70.6%
MAT-282	1	1	100.0%	100.0%	9	6	66.7%	75.0%
MAT-283	-	-	-	-	3	3	100.0%	100.0%
MAT-285	-	-	-	-	3	3	100.0%	100.0%
MAT-286	-	-	-	-	-	-	-	-

Fall 2015	Black/African American				Hawaiian/Pacific Islander			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	58	37	63.8%	75.5%	2	1	50.0%	50.0%
MAT-150	64	41	64.1%	85.4%	4	3	75.0%	75.0%
MAT-155	9	3	33.3%	50.0%	-	-	-	-
MAT-160	32	17	53.1%	68.0%	4	3	75.0%	75.0%
MAT-180	15	5	33.3%	45.5%	1	0	0.0%	0.0%
MAT-223	1	1	100.0%	100.0%	-	-	-	-
MAT-250	-	-	-	-	-	-	-	-
MAT-268	-	-	-	-	-	-	-	-
MAT-280	7	6	85.7%	100.0%	1	1	100.0%	100.0%
MAT-281	1	1	100.0%	100.0%	-	-	-	-
MAT-282	3	1	33.3%	100.0%	-	-	-	-
MAT-283	-	-	-	-	-	-	-	-
MAT-285	-	-	-	-	1	1	100.0%	100.0%
MAT-286	-	-	-	-	-	-	-	-

Fall 2015	Hispanic, all races				Two or more races			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	235	165	70.2%	83.3%	14	11	78.6%	78.6%
MAT-150	232	144	62.1%	77.8%	14	7	50.0%	77.8%
MAT-155	17	12	70.6%	92.3%	1	1	100.0%	100.0%
MAT-160	169	94	55.6%	72.3%	14	8	57.1%	80.0%
MAT-180	78	43	55.1%	70.5%	4	2	50.0%	100.0%
MAT-223	5	5	100.0%	100.0%	2	2	100.0%	100.0%
MAT-250	5	4	80.0%	80.0%	-	-	-	-
MAT-268	-	-	-	-	-	-	-	-
MAT-280	47	26	55.3%	78.8%	5	5	100.0%	100.0%
MAT-281	18	12	66.7%	92.3%	-	-	-	-
MAT-282	18	13	72.2%	72.2%	2	1	50.0%	50.0%
MAT-283	1	1	100.0%	100.0%	-	-	-	-
MAT-285	3	3	100.0%	100.0%	-	-	-	-
MAT-286	-	-	-	-	-	-	-	-

Fall 2015	Unknown Race/Ethnicity				White			
	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's	Enrolled	Passed	Pass Rates w/ W's	Pass Rates w/o W's
MAT-130	133	94	70.7%	80.3%	290	219	75.5%	89.8%
MAT-150	190	124	65.3%	81.0%	336	228	67.9%	83.8%
MAT-155	13	5	38.5%	62.5%	29	12	41.4%	66.7%
MAT-160	129	70	54.3%	66.7%	175	109	62.3%	80.1%
MAT-180	68	41	60.3%	74.5%	93	60	64.5%	78.9%
MAT-223	8	4	50.0%	66.7%	12	11	91.7%	100.0%
MAT-250	6	5	83.3%	100.0%	4	4	100.0%	100.0%
MAT-268	-	-	-	-	-	-	-	-
MAT-280	43	26	60.5%	78.8%	67	39	58.2%	75.0%
MAT-281	10	6	60.0%	85.7%	22	13	59.1%	76.5%
MAT-282	12	11	91.7%	91.7%	18	10	55.6%	71.4%
MAT-283	-	-	-	-	6	5	83.3%	100.0%
MAT-285	2	2	100.0%		4	4	100.0%	100.0%
MAT-286	-	-	-	-	-	-	-	-

Spring 2016 Enrollment and Demographics

CMAT Course	Spring 2016 Enrollment
MAT-130	759
MAT-150	1018
MAT-155	65
MAT-160	551
MAT-180	395
MAT-223	39
MAT-250	16
MAT-268	8
MAT-280	191
MAT-281	106
MAT-282	30
MAT-283	28
MAT-286	35

CMAT Course	Spring 2016 Enrollment by Age					
	Under 18 years old	18 - 21 years old	22 - 24 years old	25 - 34 years old	35 or older	Total Enrollment
MAT-130	3	496	137	84	39	759
MAT-150	12	577	197	165	67	1018
MAT-155	0	36	11	14	4	65
MAT-160	4	369	86	71	21	551
MAT-180	32	214	73	55	21	395
MAT-223	0	21	10	6	2	39
MAT-250	0	9	4	3	0	16
MAT-268	0	4	1	1	2	8
MAT-280	0	112	41	26	12	191
MAT-281	1	66	21	14	4	106
MAT-282	0	13	10	3	4	30
MAT-283	0	13	8	5	2	28
MAT-286	0	20	8	6	1	35

CMAT Course	American Indian/ Alaska Native	Asian	Black/ African American	Hawaiian/Pacific Islander	Hispanic, all races	Two or more races	Unknown Race/ Ethnicity	White	
MAT-130	0	52	48	2	200	18	175	264	
MAT-150	1	100	68	3	272	20	230	324	
MAT-155	0	3	4	0	16	0	16	26	
MAT-160	3	76	35	4	137	15	108	173	
MAT-180	0	59	21	2	93	5	110	105	
MAT-223	0	5	4	0	14	1	9	6	
MAT-250	0	4	0	0	2	0	3	7	
MAT-268	0	0	0	0	2	0	1	5	
MAT-280	1	29	7	0	42	3	51	58	
MAT-281	1	25	6	2	18	5	26	23	
MAT-282	0	7	3	0	6	0	3	11	
MAT-283	1	4	2	0	6	0	7	8	
MAT-286	0	10	3	1	6	0	7	8	

FOCUS ON FACULTY AND STAFF

The Mathematics Department consists of two different disciplines, College Level Mathematics and Developmental Level Mathematics. The faculty in the department currently consists of twenty-two full-time tenure-track / tenured faculty and approximately twenty-five adjunct faculty members. The full-time faculty have a median of 20 years of college level teaching experience with a range of from 2 years to 47 years. The full-time faculty are:

Department Chair and Coordinators

Dr. R. Forsstrom Mathematics Department Chair
B.S. Fairleigh Dickinson University, M.S. Purdue University, M.S. Rutgers University, M.B.A., M.Phil., Ph.D., New York University

Prof. L. Lerer Mathematics Coordinator – College Level
B.A., City College of New York, M.A., Montclair State University

Prof. R. Fusco Mathematics Coordinator – Developmental Level
B.S. Montclair State University, M.A. University of Phoenix

Faculty

Prof. A. Akbar Developmental Mathematics
B.S., M.A., University of Florida

Prof. K. Cerami Developmental Mathematics
B.S. Fairleigh Dickinson University, M.S. Montclair State University

Dr. R. Feigenbaum College Level Mathematics
B.A., Douglas College, M.S., Fairleigh Dickinson University, M.A., Columbia University, Ph.D., University of South Carolina

Prof. D. Giglietta College Level Mathematics
B.A., St. John's University, M.A., State University of New York at Stony Brook

Prof. I. Hayes Developmental Mathematics
B.A., M.A. Jersey City College

Prof. K. Higham College Level Mathematics
Candidate, Licentiate, Katholieke Universiteit

van Leuven, Belgium

Dr. C. Kallman College Level Mathematics
B.A. Providence College, M.A., Ph.D., University of Oklahoma

Prof. L. Kass Developmental Mathematics
B.S. Queens College, M.S. Hunter College, M.A. City College

Prof. N. Latham College Level Mathematics
B.S. City College, M.A. Hunter College

Dr. D. Lukaszewski College Level Mathematics
B.S., M.S., Rutgers University, M.S., Fairleigh Dickinson University, Ph.D., Rutgers University

Prof. A. Malik Developmental Mathematics
B.A. Bryr Mawr College, M.S.Ed. University of Pennsylvania

Prof. S. Mastellone Developmental Mathematics
B.A., Rutgers University, M.A. Teachers College Columbia University

Prof. J. Ockay College Level Mathematics
B.S., M.S., Seton Hall University

Prof. P. Panza Developmental Mathematics
B.A. University of Rochester, M.A.T. National Louis University

Dr. W. Rothaug College Level Mathematics
B.E. Pratt Institute, M.S., M.S., Newark College of Engineering, M.A., Ed.D., Rutgers University

Prof. T. Saltwick College Level Mathematics
B.A. Michigan State University, M.A. New York University

Prof. K. Saminejad College Level Mathematics
B.A. Queens College, M.S. Montclair State University

Prof. M. Walker Developmental Mathematics
B.A. Hunter College, M.A. City College of New York

Dr. A. Watkins College Level Mathematics
B.A., M.A., Montclair State University, Ph.D.,
Stevens Institute of Technology

Prof. R. Wieland College Level Mathematics
B.A. Rutgers University, M.S. New Jersey Instiute of
Technology, M.A. Ramapo College

Prof. M. Wiener Developmental Mathematics
A.S. County College of Morris, A.B. Cornell
University, M.S. Montclair State University, J.D.
Syracuse University

Faculty Activities

The full-time tenured faculty serve on a variety of College-Wide Committees including: the Faculty Senate, Professor Emeritus Committee, College Wide Promotion Committee, Library Committee, College Wide Sabbatical Leave Committee, Faculty Development Committee, Learning Community Committee, JK Winn School of Honors Advisory Committee, General Education Committee, the Developmental Education Council, Curriculum Committee, Academic Standing Committee, Admissions Committee, Library Committee, Learning Assessment Committee, BCC Foundation Scholarship Committee, Achieving the Dream, Task Force on Graduation and Student Success, and the Representative Assembly.

The full-time faculty are also involved in a variety of additional services to the college. Some of these projects include: Mathematics Club Faculty Advisor, Honors-by-Contract arrangements in various mathematics courses, the Gateway to Completion (G2C) Project, the First In the World Grant, the Mathematics Program Review Committee, various search committees, student and honors student advisement, representation at Open Houses, Mathematics program assessment efforts, Dual Enrollment coordination and evaluation, mathematics liaisons to the Cerullo Learning Assistance Center, the STEM-GPS grant, tutoring train and coordination for the Mathematics-Science Walk-In Center, and the Bridges to Baccalaureate (B2B) grant.

Membership in Professional Organizations

Most all of the mathematics faculty are members of one or more of the following professional organizations: Mathematical Association of America (MAA), American Mathematical Society (AMS), American Mathematics Association of Two Year Colleges (AMATYC), Mathematics Association of Two-Year Colleges of New Jersey (MATYCNJ), National Council of Teachers of Mathematics (NCTM), National Association of Developmental Education (NADE), American Association of Community Colleges (AACC), and the Association for Women in Mathematics (AWM).

Adjunct Faculty

The Mathematics Department has well established procedures for the hiring and the continued support of the adjunct faculty in the department.

Every adjunct who is hired goes thru an interview process conducted by a committee consisting of full-time mathematics faculty. In addition to providing information about their academic background and relevant employment experience, each applicant is required to present a mini-lesson on a topic in mathematics. The purpose of this mini-lesson presentation is for the committee to be able to observe the applicants teaching style, boardwork, oral presentation, and interaction with the participants.

Every new adjunct faculty member is provided with a twelve page manual that has been developed by the Mathematics Department Chair and which contains information on virtually every aspect of the policies and procedures for the college, for teaching a course, for developing a grading policy, for dealing with student issues, and giving examinations. It also includes information on the Mathematics Club, the Honors Program, and support mechanisms that are available for the students.

Each mathematics course has a full-time faculty member who serves as the course coordinator. All new and returning adjuncts are required to interact with the course coordinator during the course of the semester to make certain that their grading policy, schedule of coverage of material, examinations, and classroom procedures are all acceptable. The course coordinator also serves as the first point of contact for any questions that the adjunct faculty member may have about the course.

Support Staff

The Mathematics Department currently has one full-time secretary who performs all of the secretarial tasks for the full-time and part-time faculty in both the Developmental Level and the College Level Mathematics disciplines.

FOCUS ON CURRICULUM

The A.S. Degree Program in Mathematics prepares students to transfer into the Junior year of a baccalaureate program in mathematics or a related area such as statistics or actuarial science (see: Appendix). The degree program consists of 30 General Education credits, 9 program support credits and includes the required courses of Calculus I, II, and III, Differential Equations, and Linear Algebra, as well as elective courses in Discrete Mathematics, Statistical Methods, and Computer Science.

In addition to course work in the degree program, students have many opportunities to extend their mathematics preparation by engaging in honors mathematics courses, participating in the Mathematics Club, working as a mathematics tutor in the Mathematics and Science Walk-In Center, and competing for various Mathematics scholarships that are available.

Curriculum Map

The following are the learning outcomes for the successful completion of the A.S. Degree in Mathematics. Below each goal is the specific course learning outcome associated with each goal. Syllabi for each course are attached.

1. Understand the fundamental concepts of functions and relations, be able to work with function notation, and understand how functions are used to represent real-world applications.

   MAT 155 (1) MAT 160 (2, 3) MAT 180 (9) MAT 223 (1,4, 13)
   MAT 280 (2) MAT 281 (1) MAT 285 (3) MAT 286 (1)

2. Work with formulas, including formula evaluation and solving a formula for any of the variables.

   MAT 155 (1) MAT 160 (1) MAT 180 (9) MAT 223 (2,3,5)
   MAT 268 (5) MAT 280 (1,2,3,4,6) MAT 281 (1,3,6,7,8) MAT 285 (1,4)
   MAT 286 (1)

3. Construct labeled graphs of functions to accurately convey information.

   MAT 155 (1) MAT 160 (7) MAT 180 (7, 8) MAT 223 (7)
   MAT 268 (2,7) MAT 280 (5)

4. Solve equations involving algebraic functions, exponential functions , logarithmic functions, trigonometric functions, and derivatives of functions.

   MAT 155 (3) MAT 160 (1, 6) MAT 180 (1,2,5) MAT 223 (6,8,12,13,14)
   MAT 280 (4, 8) MAT 281 (2,7) MAT 283 (1,2,3,4) MAT 286 (1,4)

5. Apply various mathematical techniques to obtain approximate solutions to problems for which an exact solution is not possible or easily obtained.

MAT 280 (6) MAT 281 (5,6) MAT 282 (2,3,4,5,6) MAT 283 (4)
MAT 285 (1,3,6,8) MAT 286 (1,3,4)

6. Apply the techniques of both differential calculus and integral calculus to problems involving functions of both one and several variables.

MAT 223 (6,8,10,12,13,14) MAT 280 (1,3,4,6,8) MAT 281 (1,2,3,5)
MAT 282 (2,3,4,5,6) MAT 283 (1,2,3,4)

7. Construct a mathematical model of a real-world problem, translate the model into a mathematical problem, determine the solution(s) of the problem and interpret the solution(s) both mathematically and in real-world terms.

MAT 155 (4) MAT 180 (9) MAT 223(8,10,12,13,14) MAT 280 (3,4,6,8)
MAT 281 (2) MAT 282 (4,5,6) MAT 283 (1,2,3,4) MAT 285 (1,3,6,7,8)
MAT 286 (1,3,4)

8. Apply mathematics to the solution of problems from other disciplines.

MAT 155 (4) MAT 160 (1) MAT 180 (9) MAT 223 (8,10,12,13,14)
MAT 268 (4,5,6,7,8) MAT 280 (3,4,6,7,8) MAT 281 (2) MAT 282 (4,5,6)
MAT 283 (4) MAT 285 (1,3,6,7,8) MAT 286 (1,3,4)

9. Communicate effectively using mathematics by employing proofs to validate properties and arguments involving various theorems and properties in mathematics.

MAT 285 (1,2,4,5) MAT 286 (2)

10. Derive other mathematical properties from a given set of mathematical properties or axioms.

MAT 285 (1,2,5,6,7) MAT 286 (2)

In addition to the A.S. Degree Program in Mathematics, the Mathematics department provides General Education courses in support of all other degree programs at the college. These General Education Mathematics courses satisfy the General Education goals of the college and the New Jersey State general Education goals as well as the LEAP Essential Learning Outcomes, as follows:

Code	**Bergen General Education Goals**	**Courses**
BCC2	Quantitative Knowledge and Skills	MAT 130, MAT 150, MAT 155, MAT 180, MAT 223, MAT 250, MAT 280, MAT 281, MAT 282
BCC9	Information Literacy	MAT 250
Code	**LEAP - The Essential Learning Outcomes**	
ELO-A	Knowledge of Human Cultures and the Physical and Natural World	MAT 180, MAT 280, MAT 281, MAT 282
ELO-B1	Inquiry and Analysis	MAT 130, MAT 150, MAT 155, MAT 180, MAT 223, MAT 250, MAT 280, MAT 281, MAT 282
ELO-B4	Quantitative Literacy	MAT 130, MAT 150, MAT 155, MAT 180, MAT 223, MAT 250, MAT 280, MAT 281, MAT 282
ELO-B5	Information Literacy	MAT 250
ELO-B6	Teamwork and Problem Solving	MAT 130, MAT 155, MAT 180, MAT 223, MAT 280, MAT 281, MAT 282

.

Curricular Issues

As described previously, the most significant curriculum change in mathematics has been the replacement of the singular "one size fits all" developmental algebra course with two distinct developmental algebra courses. The MAT-040 algebra course is intended for all students who curriculum only requires them to take a general education mathematics course such as MAT-130 Contemporary Mathematics, MAT-150 Statistics I, or MAT-155 Finite Mathematics. The MAT-048 course is intended for all students who curriculum to complete a higher level college mathematics course such as MAT-223 Calculus for the Managerial and Social Sciences (required for most four-year business degree programs), MAT-268 Statistical Methods (required for many four-year degree programs in Psychology, Sociology, and the Allied Health Science, or course in the Calculus sequence (required for all STEM majors).

No new courses have been developed for the College Level mathematics discipline since current course offerings satisfies all of the requirements for the first two years of any four-year program in mathematics (mathematics on this level tends to remain very stable in its content and curriculum structure).

.

Lead-in Courses

During the past two years, the Mathematics Department has developed and offers every summer and every winter "boot camp" courses for some of the mathematics core sequence courses for STEM majors (Developmental Algebra, MAT-160 Intermediate Algebra and MAT-180 Precalculus). By completing these courses the student has the opportunity to test out of the particular course or, if they choose not to do so, then they are at least in a much better position to be successful in the particular course.

Currently, the Mathematics Department offers dual enrollment mathematics courses at a few different locations that allow students to take our mathematics courses at their high school and taught by the high school teacher.

Scheduling

Enrollment in all levels of mathematics courses continues to be strong. The scheduling pattern of courses has fulfilled student academic needs in mathematics. In the near future, consideration will be given to additional online classes and/or hybrid classes. Mathematics offerings at the Meadowlands will continue to be expanded on both the developmental level and the college level.

Assessment

Assessment is an ongoing and a continual process to update syllabi and materials to make certain that Student Learning Outcomes are met. The most recent assessment project is described below. The results will be used to examine the content and presentation of the course material.

Assessment Period: 2014-2016

Department/Program: Mathematics

Department Chair: Dr. Randolph Forsstrom

Department Assessment Liaison: Professor Lenore Lerer

1. Semester 1: Creating a program-level assessment plan

Program Learning Goal(s) or Outcome(s) to be assessed:

Understand the fundamental concepts of functions and relations, be able to work with function notation, and understand how functions are used to represent real world applications.

Means of Assessment:

A study of four problems from the departmental final examination that relate to the above program goal.

Feedback from Dean: 'Overall, I think this will have a very reasonable assessment study. It would be an even more interesting study, if these problems were similar to ones used in the preliminary exams, and we could measure the changes in the targeted competences from the primary to the final exam'.

2. Semester 2: Developing an assessment tool and timeline

Collecting student scores (and examples of student work) from problems 1, 3, 17, and 18 on the final exam over two semesters (spring 2015 and fall 2016). Scores will be summarized and analyzed.

We will be looking for a score of at least 70% on each problem. Significant deviations from the 70% goal will result in a discussion within the department about changes to improve student success.

3. Semester 3: Collecting and Analyzing Data

Data was collected from almost 600 students. The results are summarized here:

mean	3.18	3.62	3.04	2.27
Standard deviation	1.99	1.79	1.87	1.96

Question #1) 64%

Question #3) 72%

Question #17) 61%

Question #18) 45%

Clearly, the goal of 70% was not met. In analyzing the errors, it is clear that student have the most difficulty in the following areas:

1) Some students are required to put answers in interval notation, while others are required to write the answer in inequality notation. They seem to have less difficulty with inequality notation than with interval notation.

2) Finding the inverse of a function is problematic. The process involved is not completely mastered.

3) The concept of domain as it relates to radicals is also an area of difficulty.

Recommendations for Improvement:

.

The following recommendations came from some of the faculty involved in the assessment project:

a) For the most part the trouble students could be having with these problems lies less with the concepts involved, than with the algebraic machinery that must be employed. For instance, with respect to problem 18, this problem asks to find the inverse of a function. Now the concept involved would be that for any one-one function, that function has an inverse that exists,----but finding that inverse (at least the one in problem 18) could involve "moving terms", collecting several occurrences of the variable, then factoring that variable so that there is only one occurrence, then finally dividing. Also with respect to finding inverses, when the initial variable "switch" is done for the "new y", perhaps placing a tick mark on that new y will remind students to change it at the end of the process to inverse function notation. Students need to really sharpen their algebraic machinery skills.

   With respect to the concept of the domain of a function, perhaps suggesting that a function is a sort of machine that "runs" on domain values which crank-out function values (y-values--which students have to be reminded they are); and that certain values (restricted values) with certain functions shut down the machine--so are not allowed.

b) 17 and 18 are evaluating functions (difference quotient) and finding the inverse. If we include more applications involving functions our students may better understand what they mean, especially by the domain of the function.

c) The dean's suggestion that we measure the changes in the targeted competences from the primary to the final exam is a very reasonable one. Perhaps more reinforcement over the course of the semester would be indicated.

4. Semester 4: Closing the loop and sharing knowledge

   At the end of the spring semester 2016, a meeting was held of all faculty teaching MAT 160 Intermediate Algebra to discuss implementing these (and future) recommendations beginning with the Fall 2016 semester.

FOCUS ON SUPPORT

Faculty Liaisons to the Cerullo Learning Assistance Center (CLAC)

The faculty liaisons facilitate communication between the Mathematics Department and the CLAC in order to improve the quality of tutoring in mathematics courses. The liaisons regularly report information to the Mathematics Department and the Mathematics Tutorial Supervisor and conduct weekly Tutor Training Workshops on topics determined to be important by the Mathematics Tutorial Supervisor, the STEM Tutorial Supervisor, the Mathematics Liaisons, and the mathematics faculty.

The liaisons provide students with supplemental instruction by conducting workshops for students on topics as determined by the Mathematics Liaisons, the Mathematics Tutorial Supervisor, and the mathematics faculty. The workshops also include final examination reviews for the Intermediate Algebra and Precalculus courses for which there is a departmental final examination. The liaisons also aid in the recruitment of tutors and certify that tutors are qualified to tutor specific mathematics courses.

The Mathematics Walk-In Center

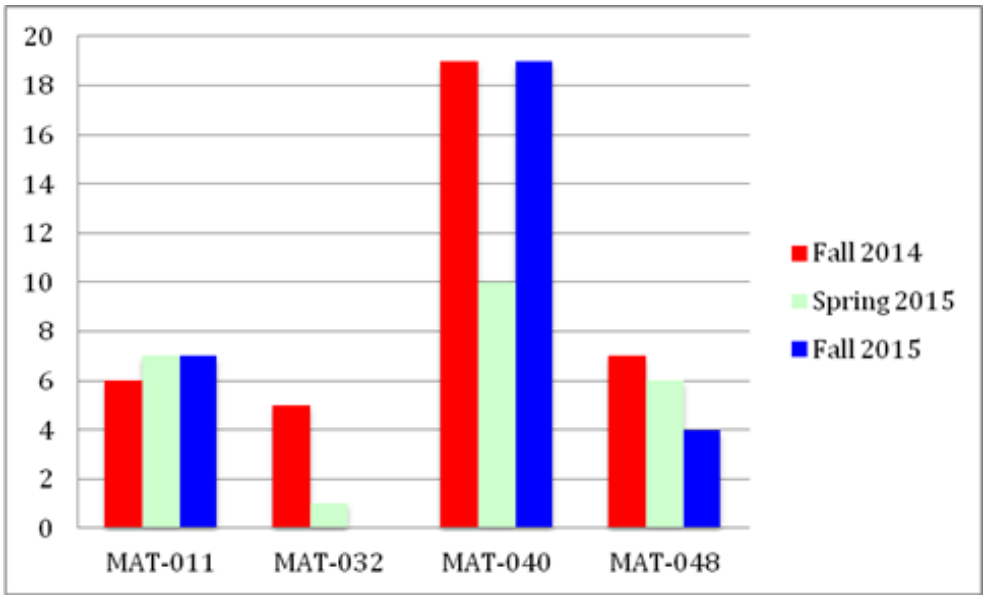
The Mathematics Walk-In Center which was created since the last program review has proven to be an extremely valuable resource for students taking any of the mathematics courses that are given by the college. It provides students with the opportunity to get virtually immediate help with any learning issue related to their mathematics course. It also provides the more advanced mathematics students with the opportunity to work in their field of study and consequently, to gain practical experience that they can include on their resume.

Mathematics at the Meadowlands

As far as student support is concerned, the tutoring center at the Meadowlands plays an important role with assisting the department with student success. The number of students utilizing the center has increased each year and this increase is consistent with the growth of the mathematics program at the Meadowlands campus.

Tutoring Center - DMAT

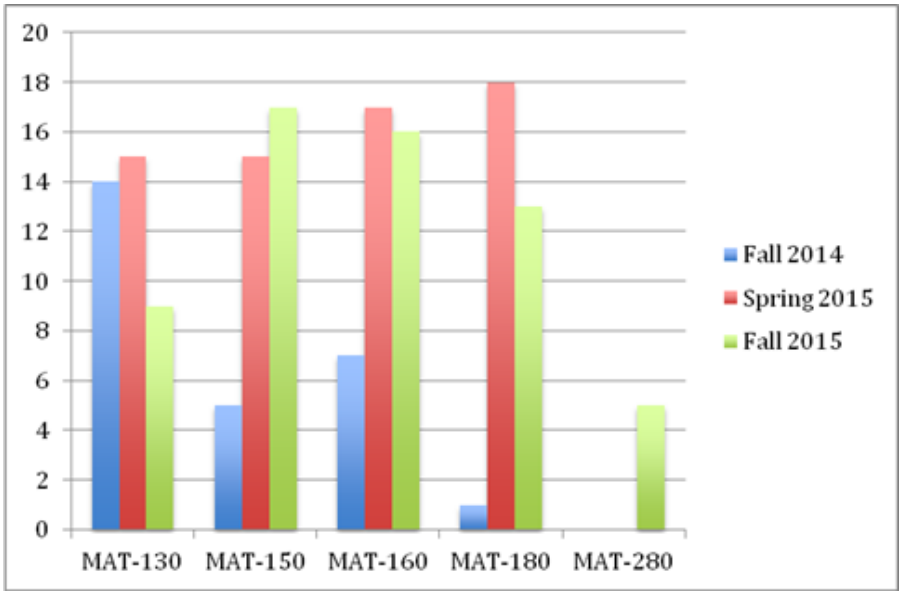
Developmental Mathematics Number of Students Tutored:



The tutoring department is a vital part with assisting the department with student success. The number of students utilizing it from semester to semester and year to year is consistent.

Tutoring Center - CMAT

College Level Mathematics Number of Students Tutored:



The tutoring department is a vital part with assisting the college level department with student success as well. Other than a definite usage, there is neither an apparent pattern nor consistency from semester to semester or year to year.

Technology Support

A. Paramus Hardware:
The TEC building houses several computer labs. In TEC-114A, known as "The Annex", there are 24 dell computers being utilized. The Title V grant has funded an additional 48 Macintosh computers in the larger TEC-114 lab, known as "The Hub". TEC-117 houses 24 HP computers. There are also several Smart Board rooms and PET stations available on reserve.

B. Lyndhurst Hardware:
There is a free time lab in Room 212 that holds 32 computers. It is open from 8:00 am to 8:00 pm. There are also 5 additional computers on both the 3rd and the 5th floor that are available from 7:00 am to 10:00 pm. The library has computers available to students during its hours of operation as well as the tutoring center. If needed, additional lab space can be made available. There is a set of basic calculators available for students to sign out and borrow. There is a PET station or Smart Board in every room.

C. Hackensack Hardware:
There is a computer lab in room 116 which holds 6 computers that can scheduled for usage during class time, if needed. It is open from 9am to 9pm. Smart technology is available for the classrooms upon request with PET stations.

D. Universal software:
The online software called "MyMathLab" from Pearson is purchased and used by students as an online textbook and support center. There is a free 14-day trial so that all students can start doing homework and utilize its resources from the first day of class. Once students purchase the software, access is valid for any future developmental courses that need to be taken by that student.

E. Paramus Training for faculty:
For the self-paced classes there are 2 training sessions every August and for the self-paced classes taught by first semester self-paced instructors, the Hub supervisors meet all classes the first day of class. Professor Mark Wiener is the MyMathLab coordinator and is available both by appointment and by email for personal assistance.

F. Lyndhurst training for faculty:
Presently, there are no self-paced classes offered at the Meadowlands campus. New faculty has the option to make an appointment with Professor Mark Wiener or Professor Keri Cerami for training in Mymathlab. For curriculum, Mymathlab or site questions new faculty can contact Professor Keri Cerami, or the developmenatal mathematics coordinator, Professor Melanie Walker.

G. Hackensack training for faculty:
Because there is just one developmental math faculty member present per semester, there is neither formal training nor a senior developmental math faculty member to refer to for questions. However, the Hackensack DMAT faculty member can contact the department chair at any time.

Learning Resources

Under the STEM GPS grant, the mathemaics department has been able to provide considerable support to students taking mathematics courses. Dr. Ruth Feigenbaum and Professor Kaat Higham serve as liaissons to the CLAC. As such, they provide the following services to the students:

- Review sessions each semester for Intermediate Algebra and Precalculus final exams.
- Review sessions for special topics in Calculus courses.
- Weekly (and sometimes more often) tutor training sessions on mathematics topics so that tutors are prepared to answer any question as well as on how tutors should interact with students.
- Grade prospective tutor palcement exams.
- One-on-one sessions with new and prospective tutors.
- Provide faculty tutoring in the Math Walk-in center.
- Enlist other math faculty to provide tutor training on select topics.

Also under the grant, mathematics faculty have provided math intensive boot camps for Intermedaite Algebra and Precalculus students each January and August. The purpose of the bootcamps is to assist students in testing out of the courses or to prepare them for success in the courses.

Marketing and Public Relations

Website: The Mathematics website is always kept completely current and contains information for potential students on the structure and goals of the Mathematics degree program, course prerequisites and proficiency examinations, credit by examination, suggested electives, all course descriptions, the Mathematics Club, honors work in mathematics, and the Mathematics faculty.

Open Houses: The Mathematics faculty have represented the department at every B.C.C. open house at both Paramus and the Meadowlands. For each of these open houses, the Mathematics faculty have prepared materials for distribution that contain information about the Mathematics degree program, the courses in it, and transfer opportunities for graduates.

Support Services

Under the STEM GPS grant, mathematics faculty have been assigned STEM students to mentor and advise. Faculty have emailed and provided one-on-one advisement to students majoring, not only in mathematics, but all STEM fields. In addition, for the past two years, faculty have participated in STEM advising days in the student center.

FOCUS ON COMMUNITY

External Requirements or Considerations

The Mathematics Program curriculum has been designed based upon the recommendations of the Mathematical Association of America (MAA) for the first two years of degree program in Mathematics. The curriculum satisfies all of the recommendations and meets the requirements that enable students to enter the junior year of a degree program in mathematics.

Mathematics Club

The Mathematics Club has continued to hold monthly meetings during which students have worked on problems in areas such as coordinate geometry, complex numbers and functions, Gauss-Jordan elimination, combinations and permutations, discrete probability, geometric rotations, and general proof techniques.

The club holds a trigonometry contest during both the Fall and Spring semesters and a number of students have participated for prizes at each of these events. Many of the club members participate in the AMATYC Student Mathematics League examinations that are given each Fall and Spring.

Mathematics Awards

The Mathematics Department continues to provide annual awards to outstanding mathematics majors. The Professor Robert Neil Ender Memorial Mathematics Award is granted to each of two mathematics majors who will be returning to B.C.C. the next academic year to continue their work towards an A.S. Degree in Mathematics. The Dr. Eric Lubot Memorial Mathematics Award is granted to a student who is graduating with an A.S. Degree in Mathematics and will be transferring to a four-year school to pursue a Bachelor's degree in Mathematics or in Statistics.

The Ender Fund is also used to award cash equivalent prizes for the top three student participants in each of the Fall and Spring Mathematics Club sponsored Trigonometry Contest.

With the approval of the Ender family, the Mathematics Department is currently engaged in identifying other opportunities to use funds from the Ender account to support and encourage students who plan to pursue degree work in mathematics.

Mathematics at the Meadowlands

Overview

Classes for both developmental math and college level math have been offered at the Meadowlands campus since it opened in Fall 2008. The Meadowlands serves a diversity of students with regard to age, gender, race and ethnicity. Both the course offerings and the amount of faculty needed to support the classes have steadily grown over the years and, as the data supports, continues to grow.

Currently, the Meadowlands campus offers most of the developmental math courses, two general education classes as well as some math track classes up to and including pre-calculus. General education students may complete all of their math requirements solely at the Meadowlands Campus. To date, only traditional classes are offered at the campus (rather than hybrid and/or self-paced.) For classes that are a limited offering and are close to are are filled to capacity (such as MAT048), and for the students who can not travel to Paramus (even via the shuttle), adding at least one self-paced option may help students satisfy their developmental math requirement without being forced to take a break with their math.

The major changes during the last 3 semesters in the developmental classes are the following: MAT032 was phased out and replaced with a MAT048 class, MAT010 was introduced for one semester within an AIMS cohort and the one lecturer position the developmental department had was eliminated.

The major change during the three semesters in college math classes is the addition of one section in pre-calculus course to the list of course offerings, the course has been running on full capacity every semester since the addition and the number of students in waiting list may suggest the addition of a second section in future. Meadowlands campus offer a variety of business courses so addition of Calculus for Business students should be considered for near future so that the students have the option of completing their degrees solely at the Meadowland campus.

In summary, based on enrollment for specific CMAT and DMAT classes, there is room at the Meadowlands for more growth with additional class section offerings, such as self-paced classes and in turn more faculty positions may want to be considered. All curriculum, testing and attendance policy that both the Paramus/Hackensack campus utilizes are strictly enforced at the Meadowlands Campus as well.

Focus on Students – DMAT Enrollment Number of Students

Semester	Number enrolled solely at Meadowlands	Overall number enrolled at BCC	Percent of students enrolled at Meadowlands
Fall 2014	287	3602	8.00%
Spring 2015	182	2251	8.00%
Fall 2015	192	2992	6.40%

The trend with both the increase and decrease of enrollment numbers at the Meadowlands seems consistent with the trend overall in the department at Bergen.

Fall 2014

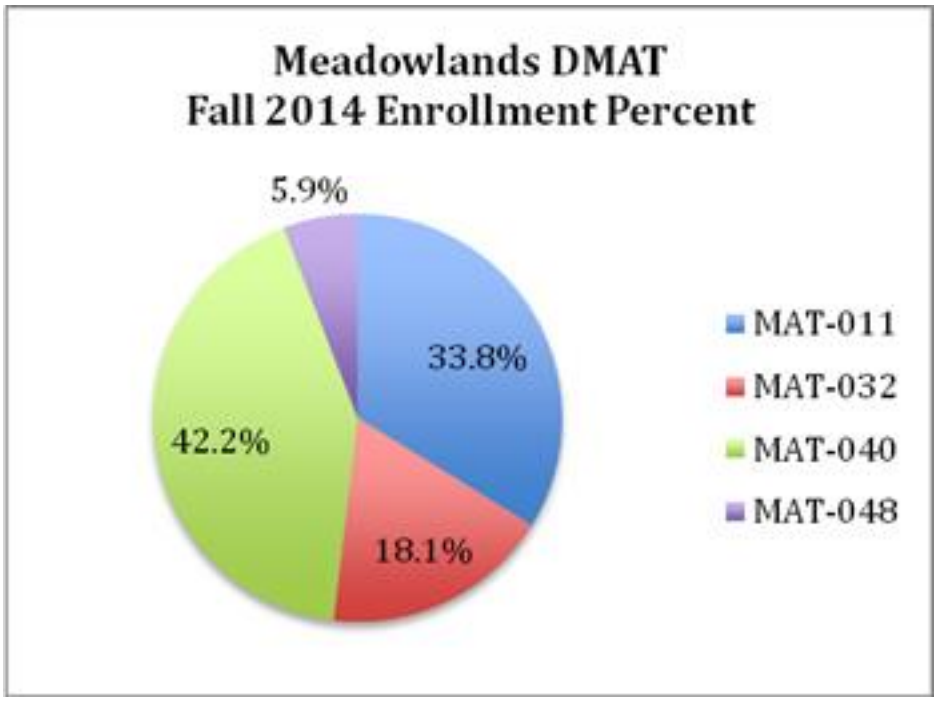
MAT-010	0	388
MAT-011	97	1390
MAT-032	52	529
MAT-040	121	847
MAT-048	17	207

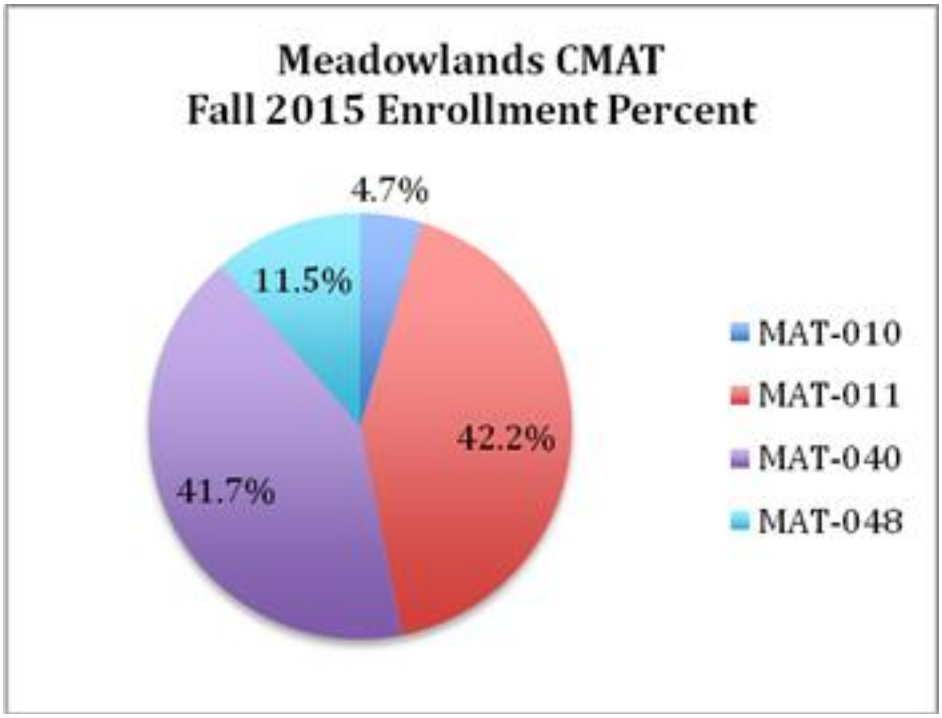
Fall 2015

MAT-010	9	403
MAT-011	81	1274
MAT-032	0	0
MAT-040	80	775
MAT-048	22	267

One attribute to why perhaps the numbers went down from Fall 2014 to Fall 2015 is due to fewer sections being offered. More specifically, the department phased out MAT032 Fall of 2015 so we lost 2 sections with full classes. Also, we lost a filled MAT011 class due to the addition to MAT010. Even though a MAT010 class was added in Fall 2015 it was specific for an AIMS cohort with only 9 students registered for it, because the AIMS class tied in with and replaced one of the MAT011 it attributed to lowering the MAT011 numbers.

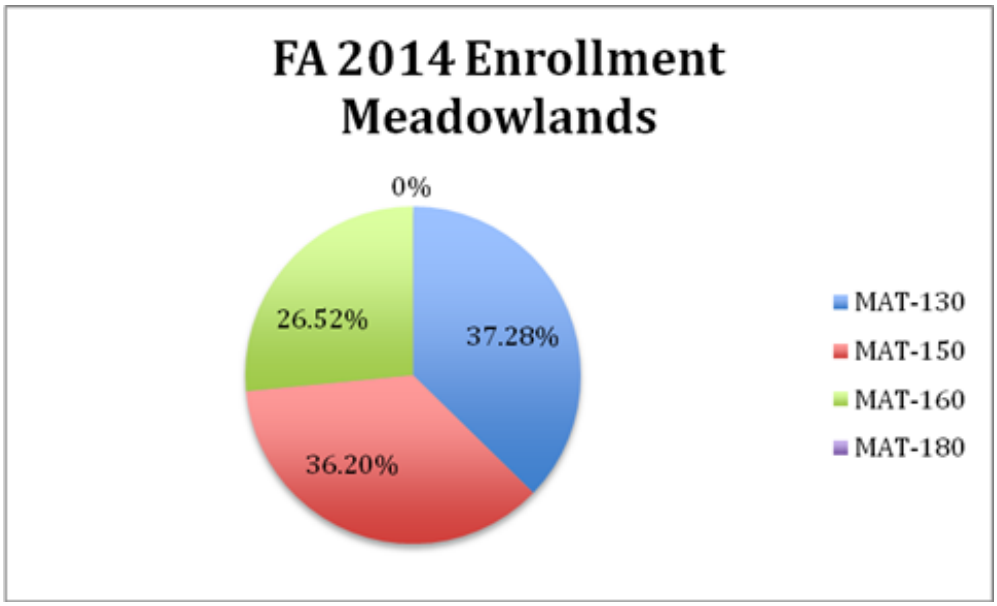
Focus on Students – DMAT Enrollment Percent of Enrollment

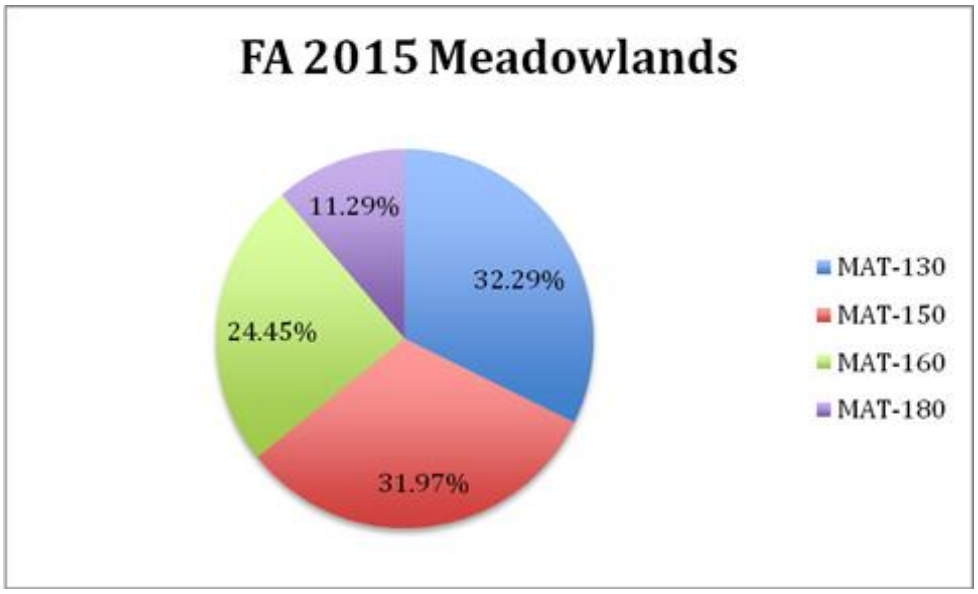




The charts above compare the percent of student enrollment per DMAT course that were offered both in Fall 2014 and Fall 2015. Even though one of the MAT011 classes was replaced with a small AIMS class that contained just 9 students, the percentage of MAT011 students overall was more than Fall 2014. MAT040 stayed relatively the same and the MAT048 doubled in percent, relative to the total student enrollment.

Focus on Students – CMAT Percent of Enrollment





The charts above compare the percent of student enrollment per CMAT course that were offered both in Fall 2014 and Fall 2015. The Chart suggests that there is a consistency in enrollment for the two years as depicted. Addition of new courses may help increase the enrollment in this campus.

Focus on Students – Developmental Math Success Rates Per Course

The tables below compare the pass rates of Meadowlands' students to BCC students in general for MAT011, MAT040, MAT048 MAT010 and MAT032. The data does not include the population that withdrew from the class. As depicted in the tables below, the pass rates for each of the DMAT courses offered at the Meadowlands campus are either equal to or greater than the overall success rate at BCC. MAT032 does not have data for the fall 2015 semester as it was phased out by then. MAT048 had a lower success rate the first semester at the Meadowlands most likely due to the fact it was offered for 12 weeks, rather than 15 weeks with 9 fewer class-meeting days (even though total meeting hours were the same.) 15 weeks proved to be more effective towards the success of developmental math students for a 5-credit math course. MAT010 only has one semester of data as it was only offered once, during fall 2015, as part of an AIMS cohort.

MAT011 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	70.3	65.2	76.3
BCC Overall	65.1	65	67.5

MAT040 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	61.8	70.4	72.9
BCC Overall	69.7	70.5	70.9

MAT048 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	46.67	70.6	66.7
BCC Overall	56.4	60.3	65.7

MAT032 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	62.2	100	
BCC Overall	65.4	71.8	

MAT010 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands			57.1
BCC Overall	72.8	70.8	78.9

Focus on Students – College Math Success Rates Per Course

The tables below compare the pass rates of Meadowlands' students to BCC students in general for MAT-130, MAT150, MAT160 and MAT-180. The data does not include the population that withdrew from the class. As depicted in the tables below, the pass rates for each of the CMAT courses offered at the Meadowlands campus are aligned to the overall success rate at BCC. In some cases it seems that the success rate in the Meadowlands is lower than overall but we have to consider that the number of sections offered is lower in the Meadowland campus and thus the success rate seems to be skewed.

MAT-130 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	78	65	70
BCC Overall	83	83.7	85

MAT-150 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	77	82	86.2
BCC Overall	79	83	82.4

MAT-160 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands	63.5	72	66.67
BCC Overall	65	72.3	74.4

MAT-180 Passing Rate (%)

	FA 2014	*SP 2015*	*FA 2015*
Meadowlands		75.8	61.6
BCC Overall		80.3	73.8

General Enrollment By Gender

MAT Course at Lyndhurst	Fall 2014			
	Male Enrolled	Female Enrolled	Unknown Enrolled	Total Enrolled
MAT-010	-	-	-	-
MAT-011	48	40	9	97
MAT-032	30	18	4	52
MAT-040	52	61	8	121
MAT-048	9	6	2	17
MAT-130	50	48	6	104
MAT-150	48	51	2	101
MAT-160	42	25	7	74
MAT-180	-	-	-	-

MAT Course at Lyndhurst	Spring 2015			
	Male Enrolled	Female Enrolled	Unknown Enrolled	Total Enrolled
MAT-010	-	-	-	-
MAT-011	33	20	3	56
MAT-032	7	4	1	12
MAT-040	44	46	4	94
MAT-048	10	7	3	20
MAT-130	65	59	10	134
MAT-150	64	63	4	131
MAT-160	28	20	2	50
MAT-180	19	12	2	33

MAT Course at Lyndhurst	Fall 2015			
	Male Enrolled	Female Enrolled	Unknown Enrolled	Total Enrolled
MAT-010	8	1	-	9
MAT-011	35	44	2	81
MAT-032	-	-	-	-
MAT-040	45	30	5	80
MAT-048	16	6	-	22
MAT-130	54	45	4	103
MAT-150	46	55	1	102
MAT-160	55	18	5	78
MAT-180	22	13	1	36

The trend shows about equal enrollment for males and females except for the calculus track, where the enrollment for males is slightly higher than the females.

.

General Enrollment by Age:

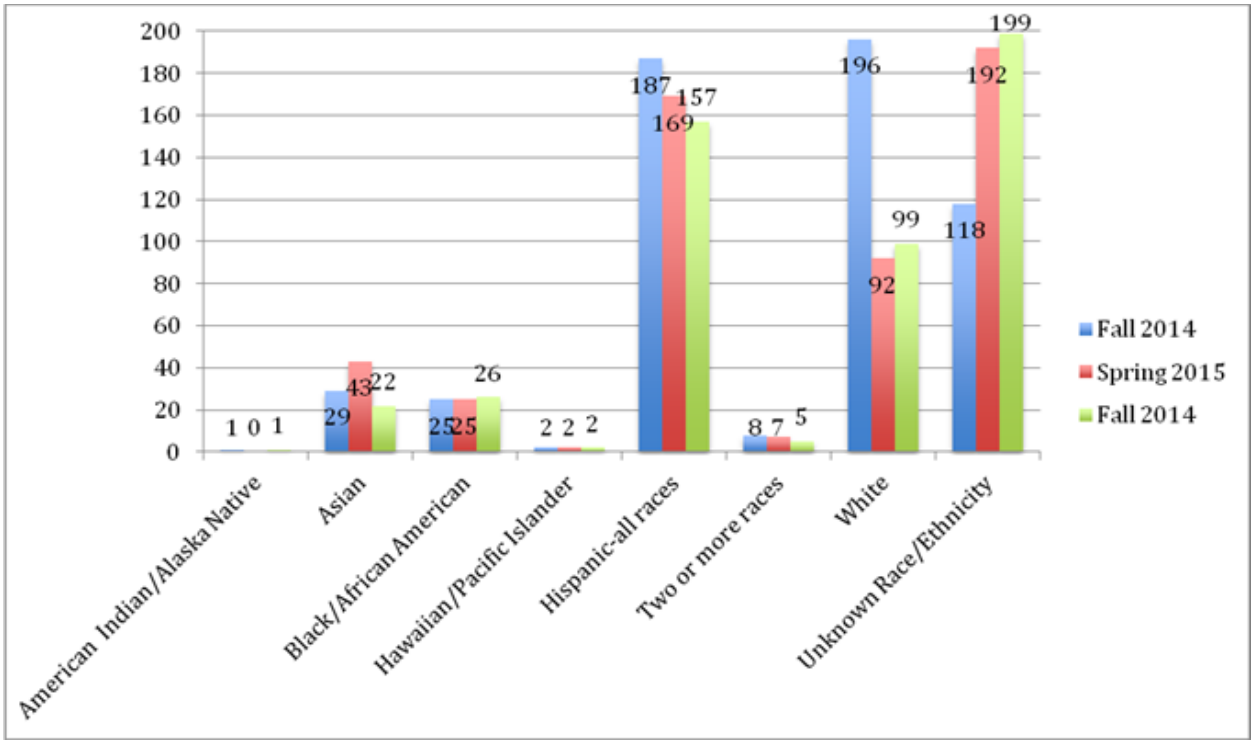
MAT Course at Lyndhurst	Fall 2014				
	Under 18 years old	18 - 21 years old	22 - 24 years old	25 - 34 years old	35 or older
	Enrolled	Enrolled	Enrolled	Enrolled	Enrolled
MAT-010	-	-	-	-	-
MAT-011	1	72	9	11	4
MAT-032	-	27	14	8	3
MAT-040	2	74	25	17	3
MAT-048	-	9	3	4	1
MAT-130	1	71	21	7	4
MAT-150	-	62	18	19	2
MAT-160	-	35	21	15	3
MAT-180	-	-	-	-	-

MAT Course at Lyndhurst	Spring 2015				
	Under 18 years old	18 - 21 years old	22 - 24 years old	25 - 34 years old	35 or older
	Enrolled	Enrolled	Enrolled	Enrolled	Enrolled
MAT-010	-	-	-	-	-
MAT-011	1	40	9	3	3
MAT-032	-	7	3	1	1
MAT-040	-	74	10	7	3
MAT-048	-	16	2	1	1
MAT-130	-	77	34	19	4
MAT-150	-	58	32	34	7
MAT-160	-	38	4	7	1
MAT-180	-	19	8	6	-

MAT Course at Lyndhurst	Fall 2015				
	Under 18 years old	18 - 21 years old	22 - 24 years old	25 - 34 years old	35 or older
	Enrolled	Enrolled	Enrolled	Enrolled	Enrolled
MAT-010	-	8	1	-	-
MAT-011	-	62	9	8	2
MAT-032	-	-	-	-	-
MAT-040	-	45	22	7	6
MAT-048	1	14	5	2	-
MAT-130	-	70	23	7	3
MAT-150	-	56	23	16	7
MAT-160	-	42	18	15	3
MAT-180	-	21	12	3	-

The majority of the students enrolled at the Meadowlands campus are within the 18 – 21 age range. As the ranges increase, the number of students enrolled decreases.

General Enrollment By Race and Ethnicity



With taking the unknown race/ethnicity out of the analysis, there is a distinct difference between the number of white and Hispanic students enrolled versus the number of American Indian/Alaska Native, Asian, Black/African American, Hawaiian/Pacific Islander and two or more races of students enrolled.

Focus on Enrollment – Available Seat Calculations

Developmental Math Available Seat Information

	Class	Capacity	Enrollment	Available Seat
FALL 2014	MAT-011	96	91	5
	MAT-040	120	110	10
	MAT-048	24	15	9
FALL 2015	MAT-011	96	76	23
	MAT-040	120	70	50
	MAT-048	24	21	3

College Math Available Seat Information

	Class	Capacity	Enrollment	Available Seat
FALL 2014	MAT-130	140	135	5
	MAT-150	105	89	16
	MAT-160	75	65	10
FALL 2015	MAT-130	140	137	3
	MAT-150	105	101	4
	MAT-160	75	67	8
	MAT-180	35	35	0

Based on the tables above, the CMAT classes have no or close to no available seats left over all of the sections offered. Historically the college level classes have had waiting lists for all of the courses offered. An additional section of MAT130, MAT150 and MAT180 may want to be considered based on both history and the data above.

Focus on Faculty

The data table below shows that over the last year and a half the number of math faculty members has not increased. In fact, a lecturer position was lost and replaced with 3 different adjuncts Fall 2015. It may be helpful for the students to have a consistent full-time lecturer at night so that office hours can be extended for those students should they need it (especially since the tutoring center hours are currently primarily for daytime students.) The DMAT nighttime professor has been supported by one of the full-time math faculty members via email (ie answering questions, reviewing exams written.) Should a full-time night faculty member be reinstated then scheduling should be considered to be able to attend the once a month faculty meetings at Paramus, so that any updates can be known and involvement within the department can be encouraged. If that is not possible then perhaps an adjunct who can remain there semester after semester can be put in place. The college level has both a consistent lecturer and tenured-track line in place.

	Tenured/ Tenured Track	Lecturer	Adjunct	Total # Faculty
FALL 2014	**2**	**2**	**3**	**7**
SPRING 2015	**2**	**2**	**1**	**5**
FALL 2015	**2**	**1**	**3**	**6**

The ratio of total math instructors (both full and part-time) to total students for:

Fall 2014	Spring 2015	Fall 2015
7 to 566	5 to 438	6 to 511

Focus on Curriculum Overview

The Meadowlands campus is able to accommodate general education (amongst other) students so that they can complete all of their math requirements there, without having to take either an online math class or commute to Paramus. As of Spring 2016 the math courses that are offered are MAT011, MAT040, MAT048, MAT130, MAT150 and MAT160. Where both MAT130 and MAT150 both satisfy general education major math requirements and other majors that do not require Precalculus/calculus.

Course changes: During the Fall 2015 one section of MAT010 was offered (support class for MAT011) but it was reserved for an AIMS cohort. For future semesters, it is recommended to offer one section of an MAT010 for the general public so that students are not placed in a MAT011 class without it (which happens) or does not have to travel to another campus if they do not wish to. Also, as a result of the restructuring of the developmental math curriculum, MAT032 was phased out by Spring 2015.

Due to an increased need for the science, math, engineering, business and computer science majors MAT180 was offered starting Fall 2015 and has been running with maximum number of students each semester. It is anticipated that both Calculus and Business Calculus will be offered Fall 2016.

Many changes have already been made to accommodate the needs of the Meadowlands students. However, it would be beneficial for the developmental math students to have a self-paced option as well as MAT010 support class, for the students that test into it. Based on enrollment for Calculus track students, it would be beneficial for both one section of a Calculus I and a business Calculus class to be offered at the Meadowlands' site.

Focus on Curriculum: DMAT and CMAT Suggestions:

Students who Opted for T-Section following taking a traditional dev math class at Meadowlands.

Term	# of Students who took DMAT at Lyndhurst	# of Students who then took T-Section in either FA2014, SP2015 or FA2015	Percent of Students who have attempted a T-Section course following a traditional course
Fall 2014	287	14	4.9%
Spring 2015	179	6	3.4%
Fall 2015	183	10	5.5%

Based on the consistent and growing interest, the department may want to consider opening up one section of a self-paced class. Perhaps for the one class the tutoring center can offer one of their tutors for the class sessions and in lieu of a testing hub, the testing center can be used so students can have flexibility with exams, as they do in the Paramus hub.

MAT010, MAT012 and MAT044 are DMAT course not offered at the Meadowlands campus but have been successfully offered at the Paramus campus. That can all be addressed with a self-paced class. Perhaps if a 4 credit MAT040 self paced class open up, consideration should be taken to merge the 4-credit MAT044 with it.

Summer DMAT courses are currently not being offered at the Meadowlands. Perhaps the department may want to consider offering a MAT040 to start off with.

College math has been offering MAT-150, MAT-130 and MAT-160 in Summer I for the past two years the courses ran on full capacity and the reception of these courses by students suggests that additional courses in Summer II can be successful.

The Mathematics Department may want to investigate ways to integrate self-paced as well as additional summer classes on the Meadowlands Campus.

SUMMARY

Mission, Goals, Objective

The Mathematics Program at B.C.C. is meeting its mission of providing students with the core courses in Mathematics that meet the requirements for the Associate in Science Degee in Mathematics along with the preparation for transfer and further academic study in Mathematics.

Strengths

The primary strength of the Mathematics Program is its faculty who are committed to educating students in the field of Mathematics. All full time tenured faculty have earned graduate degrees in Mathematics, Statistics, or Mathematics Education. Several of the faculty have earned the doctoral degree in one of these fields. Students have the opportunity to take a variety of mathematics courses in various instructional formats (including traditional, online, self-paced, and honors) to prepare them for transfer as a Mathematics major or to meet their general education mathematics requirements. Additionally, students have the opportunity to learn about mathematics outside of the classroom by attending the meetings of the Mathematics Club.

Challenges

There has not been any new tenure track line in mathematics for a number of years even though two tenured faculty have been lost and all of the lecturers have been terminated. As demand for certain courses increases, especially as the end of the registration period approaches, the mathematics department is requested to open new sections; however, it is difficult, if not impossible, to find qualified faculty to teach these courses, especially at the last minute. Hiring an unqualified (or less than qualified) instructor is not in the student's best interests. Given that each Fall and Spring semester the combined Developmental Mathematics Discipline and the College Level Mathematics Discipline offer approximately two hundred sections of mathematics classes, it is always a difficult task to staff these classes with full-time and adjunct faculty who have the proper qualifications.

There are no classrooms or labs that are specifically dedicated to the Mathematics Department. Classes are scheduled into any room in the College at any time. If a class requires the use of computers then that class will be scheduled into a computer lab if a request is made. However, it is possible for a class that does not require the use of computers (lecture only) to be scheduled into a computer room.

In some cases the size of the class that a room can accommodate is not a correct room for a mathematics class. Just because a room can physically accommodate 35 desks does not mean it should do so. There are some rooms in which a class size of 35 will result in the students being seated in such a way that board space is inaccessible. There are some classrooms that should not be used for mathematics classes at any time because of their inadequate board space. There should be an adjustment made to accommodate the needs of mathematics classes so that they will not be scheduled into these unacceptable rooms. Now that the health sciences have their own building, more classrooms should be available and dedicated to mathematics classes.

Students who complete only MAT-040 should not be allowed to register for MAT-160 Intermediate Algebra. To qualify for MAT-160 the student must complete MAT-044 or MAT-048. There have been computer issues that have allowed students without the proper prerequisite to register for MAT-160. This must be resolved by reprogramming the system.

The four-years schools in New Jersey are moving (or have moved) to requiring (in certain majors) that in order to transfer a Statistics class, it must be four credits with a prerequisite of Intermediate Algebra. Some students are discovering that while they are getting elective credit for the three credit MAT-150 Statistics I course, it is not satisfying the statistics requirement in some majors. There needs to be better advisement for students whose majors at their intended transfer institutions require such a Statistics course.

The self-paced developmental mathematics courses have been given at Paramus for a few semesters and they provide an excellent alternative path for students to complete this requirement. Currently, although developmental mathematics courses have been given at the Meadowlands location for a number of semesters, there is currently no self-paced option for students at that location. It has been suggested that it is possible to begin to implement this option at the Meadowlands by starting with one class with the resources already available and that at this point in time it would not be necessary to create a separate HUB at the Meadowlands location.

Recommendations for Change

Given the large number of classes that are given by the Mathematics Department each semester and the continued difficulty of finding a sufficient number of qualified adjunct faculty to staff these classes, it is recommended that the number of tenured/tenure track faculty in the Mathematics Department be increased by two.

Continue to examine and modify as needed the pathway thru the developmental mathematics courses that lead to the college level mathematics courses. Continue to investigate alternative pathways such as the self-paced and the accelerated traditional path.

Improve data collection for graduate follow-up surveys regarding the Mathematics program.

.

ACTION PLAN

The Mathematics Action Plan:

Goal 1: Develop alternative pathways for students to complete their general education mathematics requirements.

Objective: Examine the student outcomes for the First In The World Grant in order to determine if it is a viable option for students to complete their developmental and general education mathematics requirement at an accelerated pace and, if so, what modifications need to be made to placement and support for students participating in the program. Also, to examine and compare the results for students following the traditional mode of instruction versus the self-paced mode of instruction in this accelerated program in order to determine if one of the modes is more effective than the other one.

Use the outcomes of the Gateway To Completion study of MAT-130 Contemporary Mathematics (the college level mathematics course in the FITW Grant sequence) to determine what, if any, modifications might need to be made to this course.

Timeframe: during the next two academic years.
Responsible Parties: FITW Grant Mathematics Committee, FITW Grant Liaison, Mathematics Department Chair and Coordinators, Divisional Dean
Resource Implications: funded by the FITW Grant. Additional funding will be needed for the required tutorial support.

Goal 2: Increase the success rate for students in the STEM Mathematics foundation core course sequence.

Objective: Examine the sequence of courses MAT-048, MAT-160, and MAT180 that represent the core foundation mathematics courses for students in STEM majors in order to determine what, if any, modifications need to be made in order to improve retention and graduation rates for students in STEM majors.

Initiate a second assessment cycle study of additional program learning goals that are addressed in the MAT-160 Intermediate Algebra course in order to determine the extent to which this course is meeting these goals and to then decide what, if any modifications need to be made to this course.

Examine the MAT-048 Algebra, MAT-160 Intermediate Algebra, MAT-180 Precalculus course sequence in order to improve the transition of students from one course to the next and to determine if any realignment of the topics covered in these three courses needs to be considered. Examine the activities of CLAC in order to identify opportunities to improve the tutorial support services that are offered in mathematics and to expand the number of workshops that are offered to students in these courses.

Timeframe: ongoing
Responsible parties: Mathematics Faculty, Mathematics Assessment Liaison, Mathematics Department Chair
Resources Implications: continued released time for the Mathematics Assessment Liaison.

Goal 3: Continue to expand the mathematics course offerings at the Meadowlands location.

Objective: Continue to expand the course offerings at the Meadowlands location including additional options for students to complete their developmental mathematics requirements (self-paced and accelerated) and additional course offerings in the Calculus sequence.

Timeframe: during the next two academic years.
Responsible Parties: Mathematics Faculty, Department Chair, and Divisional Dean
Resources Implications: additional faculty and support services (tutoring center) will be needed.

Goal 4: For the reasons indicated in this program review, increase the total number of full-time faculty in the Mathematics Department.

Objective: to increase the total number of tenure-track/tenured faculty in mathematics in order to insure adequate qualified coverage for the extremely large number of classes that are given by the department each semester and to accommodate the staffing needs at the Meadowlands as the number of offerings is increased at that location.

Given that over five thousand students register for mathematics courses each Fall and Spring semester, there is no doubt that this goal will have the greatest ultimate impact on the mathematics program and the College in general.

Timeframe: 2016-2017 academic year
Responsible Parties: Department Search Committee, Department Chair, Divisional Dean, VPAA, B.C.C. President.
Resource Implications: new faculty members.

Program: Natural Sciences or Mathematics – Mathematics Option
Degree: Associate in Science
Code: AS.NSM.MATH

GENERAL EDUCATION REQUIREMENTS **30**

Communication **9**
COM100 Speech Communication 3
WRT101 English Composition I 3
WRT201 English Composition II 3

Humanities **6**
Two general education courses to be selected from the following fields, with no more than one course in any one field: Arts (Art[ART], Music[MUS], Theatre Arts [THR], Cinema Studies [CIN]); History (HIS); Literature (LIT); Philosophy and Religion (PHR); or World Languages and Cultures (LAN)

Social Science Elective **3**
One general education course selected from the following fields: Economics (ECO); Geography (GEO); Political Science (POL); Psychology (PSY); Sociology (SOC) and Anthropology (ANT)

Mathematics, Natural Science, & Technology **12**
MAT280 Calculus I 4
MAT281 Calculus II 4
Natural Science Elective* 4

PROGRAM REQUIREMENTS **22-24**
MAT282 Calculus III 4
MAT283 Differential Equations 4
MAT286 Linear Algebra 4
Mathematics or Natural Science Electives** 6-8
Natural Science Elective* 4

PROGRAM SUPPORT REQUIREMENTS **9**
PHR103 Basic Logic 3
ECO101 Macroeconomics 3
One general education course to be selected from the following fields: Arts (Art[ART], Music [MUS], Theatre Arts [THR], Cinema Studies [CIN]); History (HIS); Literature (LIT); World languages and Cultures (LAN) 3

FREE ELECTIVE **3**

TOTAL CREDITS **64-66**

RECOMMENDED SEMESTER SEQUENCE

First Semester

MAT280	Calculus I	4
PHR103	Recommended: Basic Logic	3
COM100	Speech Communication	3
WRT101	English Composition I	3
……	Natural Science Elective*†	4
		17

Second Semester

MAT281	Calculus II	4
WRT201	English Composition II	3
ECO101	Recommended: Macroeconomics	3
……	Humanities Elective*	3
……	Natural Science Elective*†	4
		17

Third Semester

MAT282	Calculus III	4
MAT286	Linear Algebra	4
…….	Humanities Elective*	3
…….	Mathematics or Natural Science Elective‡	3-4
		14-15

Fourth Semester

MAT283	Differential Equations	4
……	Mathematics or Natural Science Elective‡	3-4
	Social Science Elective*	3
	Humanities Elective‡‡	3
……	Free Elective	3
		16-17

Specific Program Notes
*General Education Elective(s) – see page _____.
†The student must complete one of the following 8-credit sequences: CHM140/141 and CHM240/241, or PHY186 and PHY286, or PHY280 and PHY290.
‡The student must choose from among the following courses: MAT155, MAT265, MAT285, CHM140/141, CHM240/241, PHY186, PHY280, PHY286, PHY290, PHY291.
‡‡One general education course to be selected from the following fields: Arts (Art[ART], Music [MUS], Theatre Arts [THR], Cinema Studies [CIN]); History (HIS); Literature (LIT); World languages and Cultures (LAN)

MARIA DeLucia, Ph.D.
2080 Raritan Road Scotch Plains, NJ
Tel: 908-872-0277 Email: mariadelucia@comcast.net

Curriculum Vitae
EDUCATIONAL DEVELOPMENT AND ADMINISTRATION
Professional experience
Middlesex County College: January 1975 - present.

- Chair Department of Mathematics: 1999 – 2012
- Professor of Mathematics

Kean University

- Adjunct Faculty 2010 - present

Fairleigh Dickenson University:

- Assisted with the Institute of Math and Science. 2010.
- Adjunct Faculty. 2004 - 2011.
- Masters in Mathematical Foundations Advisory Board. 2004 - 2011.

Hunter College: 2007 - present.

- Develop and present math workshops for in-service teachers.
- Workshop leader for Math Science Partnership Grant.
- **Adjunct –** Curriculum and Teaching

Ramapo College of New Jersey: 1999 - 2011.

- Teacher/Coordinator of off site location at Middlesex County College for the Ramapo Masters Degree Program in Educational Science Technology.

grant activities

- Math Science Partnership – Hunter College
- Grant Reviewer for National Science Foundation (NSF) Grants – Wash. D.C.
- PARCC – Small State Grant to Organize A Convening of Two Year/Four Year Institutions and the K-12 Sector (September 13 and 19) worked with Rider University.
- Math Science Partnership (NJ DOE) 2010 - present. Academic Coordinator; Mentor.
- Advanced Technology Education (NSF). Co-Principal Investigator.
- Integrated Calculus and Physics - NSF.
- Integration of Math/Science Technology (NJSSI, NSF, TI).
- Eisenhower Consortium Grant.
- Math and Technology (Eisenhower MSP).
- Math-Science Partnership (US -DOE, Rutgers - ESTEEMS). Academic Coordinator and Mentor.
  - Middle School 2005 – 2007.
  - Grades 3 - 5, 2007 - 2010.
- P-12 Partnership Grant (US - DOE) 2003 - 2005. Co-Principal Investigator

ADDITIONAL PROFESSIONAL ACTIVITIES (PRESENTATIONS)

- Test Item Reviewer for PARCC Assessment
- National Association of Developmental Education National Conference:
- Presentation: Fast Tract – Co-requisite Classes in Developmental Math - Denver, Colorado - February 2013
- Presentation: Placement – ALEKS – Washington, D.C. February 2012
- Workshop presentation on Developmental Class Redesign Using Technology. Columbus, Ohio. March 2010.
- American Math Association of Two Year Colleges National Conference:
- Presentation: Teacher Preparation and the Common Core Standards – Austin, Texas – November 2011
- Presentation: Technology in Developmental Education – Boston, Massachusetts – November 2010
- Workshop presentation on Developmental Class Redesign Using Technology. Las Vegas, Nevada. November 2009.
- New Jersey Big Ideas – Committee on Bridging the Gap K – 12
- New Jersey Department of Education – Served on the Team to write the Model Curriculum for Secondary Mathematics; Worked on the developing of the Assessment Task for the Model Curriculum.
- Association of Supervision and Curriculum Development – Presentation: Common Core and Secondary Teaching
- Artificial Learning Knowledge Spaces (ALEKS): Educational consultant with McGraw Hill publications. Delivering Onsite Presentations and Webinars (across the country). 2008 - present.
- Facilitator/Developer for AMATYC Teacher Preparation Summer Institute.
- Creating and delivering activities for the integration of the TI-15 Calculator for fourth and fifth grade teachers.
- TI - Math Forward - Professional Development Leader for TI Navigator.
- Workshops: Math Conference for Special Education Teachers.
- Integration of the CBR into the science curriculum.
- The League of Innovations:
- "What is Lesson Study" New York, New York
- "Use of Technology in Statistics" Anaheim, CA.
- The Integrated Math and Science Curriculum" Kansas City, MO.
- T Cubed Conference (Teachers Teaching with Technology).
- Co-Operative Learning: "How Co-Operative Learning Can Be Effectively Used In A Mathematics Classroom."
- Presentations on Integrating the TI-Graphing Calculator and the CBL/CBR (Computer Based Laboratory/Ranger) into the mathematics curriculum (multiple NJ and NY locations).
- The Integration of Technology in the Mathematics Curriculum - With Applications: Rutgers University Graduate School of Education.
-

HONORS

- Outstanding Young Women of America.

PROFESSIONAL MEMBERSHIPS

- National Council of Teachers of Mathematics.
- Mathematics Association of America.
- American Mathematics Association of Two Year Colleges.
- Mathematics Association of Two Year Colleges of New Jersey (Vice-President of the Southern Region).
- NJ Association for Mathematics Teacher Educators
  Current President; Executive Board (2009 – present)
- National Association of Developmental Education

EDUCATION and CONTINUING DEVELOPMENT

- University of Nebraska, Lincoln, Nebraska: Ph.D. - Teaching and Learning.
- New York University, NY, NY: Graduate School of Education. Ph.D. program in Mathematics/Statistics Education.
- Rutgers University, New Brunswick, NJ. Graduate level courses in Mathematics/Mathematics
  Education (21 credits) and Statistics (21 credits).
- Jersey City State College (New Jersey City University), Jersey City, NJ. Majored in Mathematics with a minor in Education. MA, BA.

The External Academic Program Review is part of the academic review process intended to assist the academic department in fulfilling its mission and that of the College.

Report Submitted to:
Dr. William Mullaney, Vice-President of Academic Affairs

Dr. P.J. Ricatto, Dean, Division of Mathematics, Science, and Technology

Mathematics Department Program Review Team

Dr. Randolph Forsstrom, Mathematics Department Chair, Program Review Chair
Professor Keri Cerami, Developmental Mathematics
Professor Lenore Lerer, Mathematics Coordinator – College Level Mathematics
Professor Tracy Saltwick, College Level Mathematics
Professor Kaveh Saminejad, College Level Mathematics
Professor Melanie Walker, Developmental Mathematics

Vision

Bergen Community College will be a dynamic partner by bridging potential with opportunities for educational, professional and personal growth.

Mission

To inspire our community to realize a better future.

Values

To fulfill the vision and mission of Bergen Community College, these core values will guide our daily endeavors: learning, excellence, integrity, respect and creativity. These core values will guide our daily endeavors.

The mission of the Mathematics Discipline is to promote excellence in the teaching and learning of mathematics by:

- **Offering a broad selection of courses that are designed to meet diverse student needs.**
- **Providing students with an awareness of the connections of mathematics to other subjects and to strengthen each student's ability to apply mathematics to these subjects.**
- **Promoting critical thinking through course work that emphasizes problem solving and applications.**
- **Introducing students to the effective uses of technology in mathematical problem solving.**
- **Promoting scholarly activity among all of the mathematics faculty and students majoring in mathematics.**
- **Encouraging and supporting faculty collaboration with colleagues from other disciplines to modify and develop mathematics courses that support other programs of study.**

The framework for this Program Review will:

- Review of the program goals
- Examination of Strengths
- Identify areas of Concern
- Recommendations that will improve the program and benefit students

This external academic program review report is based on the self-study and supporting material submitted by the Mathematics Department and on discussions during a two visits to the main campus of Bergen Community College. The report highlights both the many strengths of the department, as well as some challenges that it faces in the near future. For this reason, I have done my best to identify some of the challenges and possible solutions. However, the fact remains that many of the challenges facing the department require either the restoration of lost faculty, resources or the allocation of additional funds.

The department should be commended for the thorough self-study they prepared. There is no question that the department has done more than its due diligence in creating this document. The department has done a remarkable job of analyzing their program, finding issues to address, and coming up with plans of action.

Program Goals:
The departments mission, program goals, objectives and learning outcomes for have been well articulated.

- Mathematics Department is as an effective and a responsive service department.
- The department is highly committed to its teaching mission.
- The department has created the necessary pathways to ensure student success.
- The mathematics faculty appears to have presence on the campus in terms of governance and service.
- Mathematics Department appears to communicate with other departments throughout the college to provide the mathematical content needed by students in various majors.

Strengths:

- Mathematics Department is a cohesive and productive department.
- The productivity of the department is impressive. Members of the faculty are participating in several federal grants that fund educational and outreach initiatives.
- The department and curriculum fosters and an environment that both challenges and supports its students. The focus of the curricula is that it supports the development of critical thinking skills. The faculty provides opportunities for the students to acquire and develop the concepts and skills needed to more fully understand the importance of mathematical processes in the real world.
- The department is highly committed to the mission of the college and department. The faculty is innovative in pursuing new strategies for the delivery/teaching of Developmental Mathematics through Advanced Courses. The faculty are involved with students through advising and department events.

- Creating a program track for STEM vs. Non-STEM to increase student success. In addition the department has a well-structured system of both GE courses and gateway courses for technical and professional programs.
- The faculty are encouraged to support efforts to make further improvements and to document changes in student learning.
- Support of the Math Center
- Outcomes assessment seems to be taken seriously by the department. It has developed several assessment instruments in both major and service courses, it has initiated a retention program in developmental courses, and it supports the highly effective Mathematics Learning Center.

Challenges:

- Increasing the pass rates in Developmental and Introductory Math Courses, while the pass rates are within the national pass rates this is still an area of concern.
- Look at the alignment of the Common Core Math Standards to the Algebra Curriculum
- New placement rules (based on the new SAT, PARCC test); College Ready is defined as proficient in Algebra II.
- Increase the number of full-time faculty.
- Create a course to meet the needs of Elementary Education Majors.

Recommendations:

Innovative program reforms should address academic underpreparedness and foster success in college math courses.

- I have a concern with mathematically weak students taking a development course in 7½, evidence may be limited explore the possibility of corequisite/combination courses. These courses expand the semester and can have a more substantial impact on student success of retaining the fundament concepts. **"Co-requisite courses**", which allow students to take remedial and college-level classes at the same time, are effective for many students, (Inside Higher Ed)." Review some of the recommendations of NADE on course redesign.

http://www.nade.net/site/documents/articles/RE_WarnMisconceptionsChronicle_July15.pdf
https://www.insidehighered.com/quicktakes/2016/07/07/mixed-impact-florida-reform-remedial-education

- Maintain the two modes of delivery for developmental courses the Emporium Model and traditional, as the Emporium Model is not suited for all students especially the most underprepared.
- Continue to investigate strategies to improve math instruction in introductory courses, especially college algebra and pre-calculus, and explore the possibility of the development of a quantitative literacy course as an alternative for Non-STEM majors. It is recommend that the Administration continue to support and encourage the efforts of the faculty to further advances to instructional strategies and the documentation to changes in student learning.

- Continue to work on assessing the developmental and gateway courses. Use assessment to determine if the redesigns and development of new courses are preparing student for subsequent courses. Redesign is only successful if the students are prepared for subsequent courses as validated by the data of student success.

A disconnect exists between K-12 and postsecondary expectations. One way to curb remediation rates is to ensure that students graduate from high school prepared for college and a career. That's why the standards that states are now implementing are so important.

- Students often are unaware that they are not ready for college-level courses until they fail college placement tests and are assigned to remedial courses. To prevent that lack of awareness, work with local districts to administer placement tests during the junior year of high school to measure college readiness. Work with the districts to create courses for students who score poorly can take courses in 12th grade to prepare for college-level work, which helps decrease the chance they will need remediation.
- Work with local districts Mathematics/STEM or Curriculum Supervisors to review the new NJ Student Leaning Standards (formerly the Common Core) and work to align the curriculum.
- Be proactive in the search for new, innovative ways to bridge or minimize the gap between high school and college math.

"Placement programs that focus on improving placement test scores rather than learning the mathematics may not have a meaning effect on students' long term success" (education northwest, 2013).

- Work with the Office of Testing (1) to become familiar with; (2) explore the implications of the changes in placement based on the new SAT and the rollout of the new Accuplacer.
- The faculty should become aware of the new graduation criterion for College Ready set by the NJDOE.
- The Common Core provides an opportunity for secondary and postsecondary to work together to improve student placement and increase student success. Explore the PARCC definition of College Ready – demonstrating proficiency in Algebra II and its implication of placement into credit courses. The Department should be come familiar with how to interpret of the scores of a 3, 4, or 5 on the PARCC and the implications to placement. **Question – if college ready is defined as demonstrating proficiency in Algebra II, how can credit be given to Intermediate Algebra? Answer**: **Since college ready is defined as demonstrating proficiency in Algebra II, it is recommended that degree credit not be given to an Intermediate Algebra course.**
- Sine you use ALEKS - the Knowledge Check in ALEKS can possibly be use as a challenge test to assist in moving students out of Developmental Course. Set a score that a student should attain (ex. 80%), this would indicate that they have the knowledge and skill needed to move to the next course.

"Part-Time has become the new normal"

- The department relies as heavily on adjunct instructors. The effort of the department to change this situation has had little impact. Hiring new highly quality faculty members, who can contribute to the teaching mission of the department and increase its productivity, reduces the dependence on part-time instructors.
- It is acknowledged that the majority of adjuncts are academically qualified to teach mathematics and can contribute to the students and the classroom through the their experiences and career insights. However, although adjuncts are a valuable resource for departments, their limited compensation makes it extremely difficult to require them to attend department meeting, faculty development workshops and other departmental activities. Therefore more investigation is needed to determine what should be the right balance and proportion of adjunct faculty and tenure line faculty.

"…it is the realization that teachers should study the mathematics they teach in depth, and from the perspective of a teacher. ….. before beginning to teach, an elementary teacher should study in depth, and from a teacher's perspective, the vast majority
of K–5 mathematics, there is no substitute: a strong understanding of the mathematics a teacher will teach is necessary for good teaching." (CBMS, 2010).

- **Creation of a course for Elementary Education Majors** that would be in accordance with the recommendations of the Conference Board of Mathematical Science. With the adoption of the Common Core it is important that pre-service teachers be taught the mathematics to that is taught in elementary school. **This is not an education course and should not be taught as such. The objective of this course is that it should be taught at the level for a strong understanding of the underlying concepts**. (Example: understanding place value in different bases; to be able to explain why in division of fractions invert and multiple; to explain why if you divide ½ by 1/3 you answer is greater then one and how to interpret the answer of 3/2)
- The course should also prepare the students for the new Core Academic Test (based on the common core and contains three sections Math, Reading and Writing), which they must pass before being admitted to the school of education.
- **The pre-requisite should be Intermediate Algebra.**
- It is also recommended that the course be taught by a mathematics faculty member with a degree in mathematics education in collaboration with a faculty member from the education department.

Students Assessment of the Department:
In a separate meeting with several students I discussed their perceptions of the several issues. The students I met were forthcoming in their praise of the faculty for their enthusiasm and accessibility.

- Found the Math Center very helpful for tutoring and support. Appreciated that math faculty are also available in the center.
- Appreciative of the work of the faculty to provide a student-centered curriculum. Citing that the math curriculum prepares them for their courses in other disciplines (Biology, Chemistry, Engineering and Computer Science).

- Expressed concern of full-time faculty and part-time faculty. Many of the students stated that they felt that the part-time faculty are not as knowledgeable or prepared as the full-time faculty. They also expressed concern that there is also not the same level of available support.
- Class schedule does not always work with their other courses.
- Would like to see more technology utilized.

It has been a great pleasure to meet and talk with the dedicated professors, enthusiastic students, and administrators at the college. The recommendations for departmental action made in the self-study are all excellent. The department has done an excellent job in its self-evaluation. It is important, as always, that a department never be entirely satisfied with what it is doing, but always looking for ways of improving how it serves its students. In my view, the college has a mathematics department of which it should be proud of and which, with continued support, can serve more students with wider interests to the benefit and satisfaction of all. If I can clarify any elements of this report, do not hesitate to call on me.

Respectively Submitted,

Maria DeLucia, Ph.D.
Professor of Mathematics
Middlesex County College