BS, Mathematics
Fairmont State University
5 Year Program Review
Submitted Spring 2014

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PROGRAM REVIEW
Fairmont State Board of Governors

✓ Program with Special Accreditation ☐ Program without Special Accreditation

Date Submitted____February 15, 2014______________

Program___BS, Mathematics____

Degree and Title

INSTITUTIONAL RECOMMENDATION

The institution is obligated to recommend continuance or discontinuance of a program and to provide a brief rationale for its recommendation:

_____1. Continuation of the program at the current level of activity;

_____2. Continuation of program with corrective action (for example, reducing the range of optional tracks or merging programs);

_____3. Identification of the program for further development (for example, providing additional institutional commitment);

_____4. Development of a cooperative program with another institution, or sharing courses, facilities, faculty, and the like;

_____5. Discontinuation of the Program

Rationale for Recommendation:

Signature of person preparing report:	Date
Signature of Dean	Date
Signature of Provost and Vice President for Academic Affairs:	Date
Signature of President:	Date
Signature of Chair, Board of Governors:	Date

Tab 1

Executive Summary for Program Review

(not to be more than 2-3 pages)

Name and degree level of program

Mathematics – Bachelor of Science Degree

Mathematics Education – Bachelor of Arts Degree

5-Adult Certification

5-9 Certification

External reviewer(s)

NCATE (National Council for Accreditation of Teacher Education)

Note: Although not all Math students are Math Education Majors, programmatic assessment occurs in courses common to both degrees.

Synopses of significant findings, including findings of external reviewer(s)

The recommendation of the 2009 State Program Review Committee was to continue the Mathematics Program. NCATE recognized the program with full accreditation through 2018. Our program design is supported by guidelines from the American Mathematical Society. The program demonstrates a successful approach to sustainability, viability and assessment.

Plans for program improvement, including timeline

No improvements necessary as a result of this review.

Identification of weaknesses or deficiencies from the previous review and the status of improvements implemented or accomplished

NCATE did not find any weaknesses or deficiencies.

Five-year trend data on graduates and majors enrolled

According to the National Center for Educational Statistics, undergraduate Math Degrees account for less than 1% of the total number of bachelor degrees awarded. Over the last five years the Fairmont State Mathematics Department has averaged approximately 8 straight Math Degrees and 11 total Math and Math Ed. Degrees awarded. This is 1.2% and 1.8 % respectively of the average number of bachelor degrees awarded by FSU in the four years between 2009 and 2012 according to the Fairmont State University Institutional Compact data, 2007-2012. Hence, our percentage of graduates is greater than the national average.

Summary of assessment model and how results are used for program improvement

The Mathematics program utilizes a departmental continuous improvement plan to meet institutional assessment needs. The continuous improvement plan consists of course assessment, programmatic assessment, and program modifications that are determined necessary by outcome assessments. The purpose of the Continuous Improvement Plan (CIP) is to identify, track, and remediate programmatic weaknesses. The evaluation of competencies and program components leads to modifications of content, delivery, and other factors deemed instrumental in the pursuit of programmatic improvement.

The CIP occurs at three levels. These levels include:

- Assessment of Course Outcomes
- Assessment of Program Outcomes
- Program Modifications as determined necessary by the assessment practices.

Course Outcomes are linked to appropriate Program Outcomes (see example in Appendix A) through Taskstream. The Course Outcomes are assessed using various tools such as course exams, assignments, quizzes, projects, labs, etc. The program has established a benchmark for each program outcome to demonstrate competency in each outcome. If the students cannot demonstrate success, a plan of improvement is established for the assessment point. These continuous improvement plans are approved by a collaborative agreement of the program faculty. An assessment matrix is established to clearly define what assessment points are evaluated in each program course.

Data on student placement (for example, number of students employed in positions related to the field of study or pursuing advanced degrees)

Within the past five years, the Mathematics program has graduated 54 students. This is an average of approximately 11 graduates per year. Of the 23 graduates who responded to our survey request, a combined 91.3% have either obtained full-time permanent jobs in their field or gone on to graduate studies. This breaks down to 21.7% in graduate school, 69.6% in fulltime permanent jobs, and 8.7% either in a different field or in a temporary teaching position. In addition, 95.7 percent of these students are employed or attending graduate school in West Virginia.

Final recommendations approved by governing board

Tab 2

PROGRAM REVIEW

FAIRMONT STATE UNIVERSITY	
Program:	Mathematics/Mathematics Education
School:	College of Science and Technology
Date:	2/12/14

Program Catalog Description:

The mission of the mathematics degree programs is to equip students with analytic and problem solving skills for careers and graduate study. Classes develop student abilities and aptitudes to apply mathematical methods and ideas not only to problems in mathematics and related fields such as the sciences, computer science, actuarial science, or statistics, but also to virtually any area of inquiry. Students learn to communicate ideas effectively and to digest new information and concepts independently. Students are encouraged to develop intellectually and to become involved with professional organizations.
Students interested in mathematics have the option of selecting one of the following degree programs:
1)
the Bachelor of Science degree in Mathematics, as preparation for immediate employment or for graduate school.

2)
the Bachelor of Arts in Education degree with a 5-Adult comprehensive specialization as preparation for teaching mathematics. Completion of a B.A. in Education with Specialization in Mathematics Grades 5-Adult results in concurrent completion of a B.S. in Mathematics. Students pursuing these degrees are advised in the math department. NOTE: MATH 1113, 1125, 1190, 3315, 3316, and 2212 are required for both degrees and should be completed early in the program.

3)
the Mathematics 5-9 teaching specialization can be added to an Elementary Education degree or as a second specialization with a B.A. in Education.

It is expected that incoming students in this field will present a minimum of four units of high school mathematics, including two units of algebra, one unit of integrated geometry (or equivalent), and one advanced unit such as Trigonometry or Pre-Calculus. Students without this background may be required to complete appropriate lower-level courses in addition to the stated requirements. Students should consult with their advisor concerning credit for prerequisites and special examinations for course credit. All students majoring in mathematics must complete a minor. Students who are receiving a teaching certificate generally use Education as their minor.

VIABILITY (§ 4.1.3.1)

Enrollment

Applicants, graduates

Applicant Data:

Over the past five academic years, the Mathematics program has averaged 11 accepted applicants per year with an average of six registering.

Academic Year	Accepted Applicants	Registered
2008-2009	10	2
2009-2010	14	10
2010-2011	10	3
2011-2012	14	9
2012-2013	7	7

Graduate Data:

Over the past five (5) academic years, the Mathematics program has averaged 7.8 actual graduates per year. In addition, it has averaged 3 graduates with a 5-9 Math Teaching Specialization. During this period at least 5 students minored in mathematics, as well, but the institution does not track those students.

Note: The number of actual graduates below differs from the institution data because the institution does not report double majors. Supporting records can be found in Appendix E.

Academic Year	No. of Graduates	5-9 Graduates
	Actual/Institution	
2008-2009	10/7	1
2009-2010	5/4	1
2010-2011	7/5	7
2011-2012	8/6	2
2012-2013	9/8	4

Application/ Admission Requirements

Students apply for admission to FSU through modern techniques by completion of an Application for Admission located on FSU's homepage at www.fairmonstate.edu. Once the student fully completes the application process, the student's application is reviewed for determination of admission.

Students seeking admission to Fairmont State University must be of the age of compulsory attendance in the state of West Virginia and file an application for admission. Applications and supporting credentials must be on file at least two weeks prior to the opening of a semester or term. All credentials submitted in support of an application for admission become the property of the University and will not be returned to the student. Any student admitted upon the basis of false credentials will be subject to immediate dismissal from the University.

Students who fail to register during the semester or term for which they have been admitted must file another application in order to gain admission at a later date. Separate applications for residence halls must be submitted to the Office of Residence Life. Any change in local address of any student at Fairmont State University must be reported to the Registrar.

The application for admission must specify the student's desired degree or program objective. Admission to Fairmont State University does not guarantee admission to specific programs, which may be restricted due to limitations of staff, physical facilities, and space available for experiential training.

FAIRMONT STATE UNIVERSITY ADMISSION REQUIREMENTS
FIRST-TIME FRESHMEN

1. Application for Admission
2. Official high school transcript or GED (sent by high school or Department of Education) (2.0 GPA or higher)
3. ACT or SAT Scores (18 ACT or 870 Composite SAT[combination of critical reading and math scores])
4. Transcript of home schooled students to include classes taken, credit hours and grades earned, graduation date and signature of home school provider.
5. Official College Transcript (if student has transfer credit)
6. Immunization Records (if born after January 1, 1957)

REQUIRED UNITS
The Following Units Were Required:
4 English (including courses in grammar, composition, and literature)
3 Social Studies (including U.S. History)
4 Mathematics (three units must be Algebra 1 and higher)
3 Science (all courses to be college preparatory laboratory science, preferably including units from biology, chemistry and physics)
1 Arts
2 Foreign Language (Two units of the same foreign language)

Program courses Enrollment

Five year course enrollment and success rate for all Mathematics program courses is provided below:

MATH Course Number	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Total Enrollment over 5 Years	Success Rate
1113	25	30	25	31	55	196	77.6
1125	NA	NA	NA	7	NA	7	57.1
1190	70	77	84	75	88	394	70.1
2200	20	30	25	29	34	138	65.2
2206	NA	9	NA	11	NA	20	75
2212	9	14	20	15	10	68	76.5
2216	25	22	27	27	31	132	83.3
3315	24	33	36	32	33	158	86.1
3316	18	10	16	10	16	70	84.3
3335	16	9	18	8	11	62	72.6
3342	8	NA	NA	NA	NA	8	75
3361	7	8	16	7	11	49	81.6
3362	7	14	14	17	1	53	83
3372	10	NA	15	NA	14	39	78.9
3375	12	NA	8	NA	6	26	88.5
3391	NA	5	NA	14	NA	19	78.9
4400	1	NA	NA	NA	NA	1	100
4401	NA	NA	8	NA	NA	8	75
4431	5	7	6	9	8	35	100
4498		3			1		100

A list of course titles and descriptions are provided on the following pages.

The Mathematics Program offers the following program courses:

MATH 1113 Applied Statistics
3 hrs.
This course is an introduction to statistics with appropriate applications. Topics covered include descriptive statistics, probability, binomial distribution, normal distribution, sampling, hypothesis testing and regression and correlation. A problem-solving approach and modern software will be used.
PR: MATH ACT score of 21 or MATH SAT of 500 or COMPASS score of 49 or MATH 1102 or MATH 1112.

MATH 1125 Math Reasoning: Reading and Writing
3 hrs.
This course includes topics to prepare students for mathematical reasoning by reading and writing using technical mathematics terminology and valid reasoning methods. In addition, it will prepare students for the rigor of mathematical proof in 2000 level math classes. Topics to be covered include the role of definitions in proofs, how to write definitions, the role of the conditional statement in a proof, proofs based on algebraic and trigonometric properties, two-column geometry proofs, and induction.
PR: MATH 1115 or MATH ACT 24 or (MATH 2251 and MATH 2252). Fall Semester Only.

MATH 1190 Calculus I
4 hrs.
This course is the calculus of one variable, beginning with an intuitive study of limits and a geometric interpretation of the derivative. Topics include differentiation of functions and the application of the derivative to graphing functions, approximating functions, solving max/min problems and related rate problems, anti-differentiation and its link to the signed area under a curve, the fundamental theorem of calculus and applications of the definite integral.
PR: MATH ACT score of 25, or MATH SAT 570, or COMPASS 73, or MATH 1115 or MATH 1170 or MATH 1186.

MATH 2200 Mathematical Logic
3 hrs.
This course covers sentential and general theory of inference, theory of proof and definition and elementary intuitive set theory.
PR: MATH 1115 or MATH 1170 or MATH 1185 or MATH 1190. Spring semester only.

MATH 2206 Introduction to the Theory of Numbers
3 hrs.
Topics include prime numbers, the unique factorization theorem, congruencies, Diophantine equations, primitive roots and the quadratic reciprocity theorem.
PR: MATH 1190. Spring semester   Even Years Only.

MATH 2212 Sets, Relations and Functions
3 hrs.
Topics to be studied are those related to sets, relations and functions which are common to most upper-level mathematics courses.
PR: MATH 1170 or (MATH 1125 and MATH 1190). Fall semester only.

MATH 2216 Introduction to Discrete Mathematics
3 hrs.
This course is designed to provide a survey of the reasoning and objects of study found in discrete mathematics. Topics considered include sets, relations, functions, combinatorics, graphs, trees, discrete probability and recurrence relations. Interspersed throughout the course will be material on the nature of proof and analysis of algorithms.
PR: MATH 1115 or MATH 1170 or MATH 1185 or MATH 1190. Fall semester only.

MATH 3315 Calculus II
4 hrs.
This course is a continuation of MATH 1190. Topics include applications of the definite integral, exponential and logarithmic functions, inverse trigonometric functions, techniques of integration, conic sections, plane curves and polar coordinates, limits involving indeterminate forms, improper integrals, sequences, and infinite series. Spring semester only.
PR: MATH 1190.

MATH 3316 Calculus III
4 hrs.
This course is a continuation of Math 3315. Sequences and series will be followed by a study of calculus of two and three variables. Topics include vectors, dot product, cross product, lines, planes, vector functions and their derivatives and integrals, the study of quadratic surfaces, partial differentiation, gradient and double and triple integrals.
PR: MATH 3315 or (MATH 1186 and MATH 1190.) Fall Semester Only.

MATH 3335 Probability and Statistics
3 hrs.
Course topics include sample spaces, events as subsets, probability axioms, finite sample spaces and equiprobable measure as special case, binomial coefficients and counting techniques applied to probability problems, conditional probability, independent events, Bayes' formula, random variable, probability functions, density and distribution functions, special distributions, independent random variables, Poisson and normal approximation to the binomial and some statistical applications. Students will also learn estimation and sampling, point and interval estimates, hypothesis-testing, power of a test and regression.
PR: MATH 1113, and MATH 3316 or concurrent enrollment in MATH 3316. Spring semester only.

MATH 3342 Numerical Analysis
3 hrs.
In this course, students will investigate solutions of equations, functional iteration of equations, analysis of special methods such as the methods of false position and of Newton, iteration for systems of equations, reduction to first order systems, Gaussian elimination and some iterative methods for inversion.
PR: COMP 1102 and CR: MATH 3316. Fall semester odd years only.

MATH 3361 Abstract Algebra
3 hrs.
Writing Intensive
Topics include sets, relations, functions, operations, algebraic systems such as integers, rationals and matrices, isomorphism and examples. Students will examine equivalence classes, groups, subgroups, cyclic groups, basic theorems, Lagrange's theorem, homomorphism, normal subgroups, quotient group, the isomorphism theorems, rings, integers, matrices, polynomials, integral domains, fields and quotient field. The course will also cover ideals, residue class rings, unique factorization domains, Euclidean domains, integers, polynomials over a field, division algorithm, highest common factor and unique factorization in Euclidean domain.
PR: ENGL 1108, MATH 1190 and MATH 2212. Spring semester only.

MATH 3362 Linear Algebra
3 hrs.
This course covers vector spaces abstractly defined, linear dependence and independence, bases and subspaces, dimension of linear space, linear mappings, kernel and image of maps, rank of maps, linear maps as vector spaces, composition of mappings and multiplication of matrices, the relation between linear mappings and systems of linear equations, row reduced echelon matrix, invertible matrices, calculation of inverse, linear inequalities and half spaces.
PR/CR: MATH 3315. Fall Semester only.

MATH 3372 Modern Geometry
3 hrs.
A brief review of informal Euclidean geometry, including areas and volumes. The course will also include a formal development of Euclidean geometry, utilizing concepts such as incidence, convexity separation, distance functions and angular measurement functions. Other geometric topics such as topology, non-Euclidean geometry, finite geometries, projective geometry and transformational geometry are briefly introduced.
PR: MATH 1125 and MATH 1190. Fall Semester. Even years only.

MATH 3375 Topology
3 hrs.
This course consists of the study of topological spaces and notions, including continuity, convergence, separation, compactness and connectedness.
PR: MATH 2212 and 3316. Spring Semester odd years only.

MATH 3391 Real Analysis
3 hrs.
Covers real numbers, topology of the reals, infinite series, continuous functions, sequences and series of functions, differentiation, integration and power series.
PR: MATH 2212 and MATH 3316. Spring semester even years only.

MATH 4400 Seminar
1-3 hrs.

MATH 4401 Differential Equations
3 hrs.
A study of first-order and simple higher-order ordinary differential equations and their applications, linear differential equations with constant coefficients and their application, simultaneous differential equations and their applications, the numerical solution of differential equations and solution of differential equations by use of series.
PR: MATH 3315. Spring semester odd years only.

MATH 4431 Methods and Materials in Teaching Mathematics
3 hrs.
This course is designed for senior education majors with a math teaching specialization in either grades 5-Adult or 5-9. Mathematics curricula and methods at the middle and high school levels are studied. Numerous laboratory experiences such as microteaching and math tutoring are required. 5-9 and 5-Adult must complete this course prior to enrolling in Secondary Student Teaching/Clinical III.
PR: Must be admitted to Teacher Education to take this course. Fall semester only.

MATH 4998 Undergraduate Research
0-6 hrs.
Undergraduate research is an experiential learning activity that provides an opportunity for a student to engage in the scholarly activities of their major discipline under the guidance of a faculty mentor who will work in close partnership with each student in his or her formulation of a project, the development of a research strategy, and the assessment of a student’s progress. The primary goal is for each student scholar to conduct an inquiry or investigation that makes an original, intellectual or creative contribution to their discipline and which is shared in an appropriate venue. Sophomore-Senior Level, Repeatable. Instructor approval required.

Success rates for Program Courses

***See note next page.**

The success rate is based on the number of students passing the course with a letter grade of D or better. Each column depicts the number of students that passed and failed the major course per academic year. The last column provides the % success rate for each major course.

	Number of Students Passed or Failed/Withdrew Per Academic Year										
	2008 – 2009		2009-2010		2010-2011		2011-2012		2012-2013		
MATH Course	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	5-year Pass Rate (%)
1113*	21	4	23	7	19	6	24	7	41	13	77.6
1125							4	3			57.1
1190*	52	18	58	19	60	24	54	21	52	36	70.1
2200*	12	8	22	8	17	8	16	13	23	11	65.2
2206			9	0			6	5			75.0
2212	6	3	11	3	16	4	7	3	12	3	76.5
2216*	21	4	18	4	26	1	27	4	18	9	83.3
3315*	21	3	32	1	31	5	27	6	25	7	86.1
3316	12	6	9	1	15	1	9	1	14	2	84.3
3335*	6	10	9	0	14	4	7	1	9	2	72.6
3342	6	2									75.0
3361	4	3	7	1	14	2	5	2	10	1	81.6
3362	5	2	10	4	12	2	16	1	1	0	83.0
3372	8	2			13	2			12	2	78.9
3375	10	2			7	1			6	0	88.5
3391			4	1			11	3			78.9
4400	1	0									100
4401					6	2					75.0
4431	5	0	7	0	6	0	9	0	8	0	100
4498			3	0					1	0	100

Service courses Enrollment	Five year course enrollment for all Mathematics service courses is provided below:

MATH Course Number	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Total Enrollment over 5 Years	Success Rate
1101	209	173	201	224	176	983	60.5
1102	87	76	61	98	85	407	85.2
1107	509	565	579	494	507	2654	80.3
1112	554	548	517	491	444	2554	66.7
1115	119	115	142	147	137	660	67.4
1170	28	15	NA	NA	NA	43	83.7
1185	75	56	60	62	49	302	81.1
1186	26	13	23	22	21	105	89.5
2251	57	45	43	41	48	234	91.5
2252	27	45	44	41	33	190	91.1
3353	21	40	33	37	27	158	96.8

A list of course titles and descriptions are provided on the following pages.

Service courses: The Mathematics program offers ten (10) service courses. A brief summary of each service course is provided below.

***Note**: Math 1190, 2200, 2216, 3315, 3335 are used primarily for our majors but are also required by Computer Science. Math 1113, 1190 and 3315 can be used by multiple majors.

MATH 1101 Applied Technical Mathematics I
3 hrs.
This course is an introduction to fundamental mechanics and techniques for performing operations with algebraic expressions, and subsequently solving linear equations, systems of linear equations and quadratic equations. The course also introduces trigonometric functions and is designed to develop methods of solving right angles and oblique triangles using trigonometry.
PR: MATH ACT score of 19 or MATH SAT of 460 or COMPASS score of 36 or MATH 0095 or MATH 0088.
Used by Tech majors

MATH 1102 Applied Technical Mathematics II
3 hrs.
This course is a continuation of Math 1101. Topics include solving radical equations and polynomial equations, complex numbers, exponential and logarithmic functions, inequalities and trigonometry.
PR: MATH 1101 with a "C" or better.
Used by Tech majors

MATH 1107 Fundamental Concepts of Mathematics
3 hrs.
This introductory math survey course is specifically developed to fulfill the General Studies requirements for quantitative literacy.
It is designed to strengthen computational skills while focusing on real-world problems. Topics may include critical thinking skills, sequences, set theory, logic, probability, statistics, and consumer mathematics. This course does not serve as a pre-requisite for any higher level mathematics course.
PR: Math ACT score of 19 or MATH SAT of 460 or COMPASS score of 36 or MATH 0095 or MATH 0086.
Used by many majors for General Studies credit

MATH 1112 College Algebra
3 hrs.
This course includes a review of real numbers, complex numbers, algebraic expressions, equations and inequalities of non-linear functions, functions and function operations, composition of functions, inverse functions, graphing and transformations of non-linear functions, exponents and radicals, exponential functions, logarithms, and applications.
PR: MATH ACT score of 21 or MATH SAT of 500 or COMPASS score of 49 or MATH 1100.
Used by Business majors, Elementary Education Majors, and STEM majors

MATH 1115 Trigonometry and Elementary Functions
3 hrs.
This course includes a study of circular and trigonometric functions and applications, trigonometric identities, equations and graphs of circular functions, exponential and logarithmic functions, complex numbers, functions and inverse functions and other related topics.
PR: MATH ACT score of 23 or MATH SAT of 540 or COMPASS score of 63 or a C or better in MATH 1112.
Used as a prerequisite to Math 1190, Calculus I

MATH 1170   Introduction to Mathematical Analysis

4 hrs.

This course is designed to help those students pursuing a degree in mathematics (who have not had five years of high school mathematics) gain the experience required for courses at the calculus level and beyond. Topics include an introduction to formal logic and set theory, the principle of mathematical induction, properties of real and complex numbers with proofs, general functions and related notions, sequences and series.

PR: MATH ACT score of 23, or MATH SAT 540 or Compass score of 63 or MATH 1115

No longer taught. Originally used by Computer Science.

MATH 1185 Applied Calculus I

4 hrs.

This course is a study of calculus with an emphasis on its applications to science, business, technology and social science. Topics covered using the derivative consist of functions and their graphs, max/min problems, related rates, approximation of change and curvilinear motion. Topics covered using the integral consist of area, volume and accumulation functions. Graphing calculators and mathematical software will be introduced and used throughout the course.

PR: MATH ACT score of 24, or MATH SAT 560 or COMPASS score of 67 or MATH 1115 or MATH 1102 with "B" or better.

Used by Tech, Biology and Chemistry majors

MATH 1186 Applied Calculus II

4 hrs.

A continuation of the study of calculus as applied to science, business, technology and social science. The integral will be further studied, including applications of area, volume, accumulation functions, curvilinear motion, solutions to some simple differential equations, and other applications chosen from a variety of disciplines. Students will examine sequences and series involving convergence and divergence, power series and Taylor polynomials and series. The calculus of vectors and multivariable functions will be introduced and partial derivatives and multiple integrals will be used to study applied problems from a variety of disciplines. Graphing calculators and mathematical software will be used throughout this course.

PR: MATH 1185. Spring semester only

Used by Tech, Biology and Chemistry majors

MATH 2251 Structure of the Real Numbers

3 hrs.

This course starts with basic concepts of sets and continues with properties of operations and a logical development of the set of real numbers. Beginning number theory concepts and an introduction to probability are also included. This course connects structure to prior math knowledge and real-world applications.

PR: Math 1112 or Math ACT of 23 or Math SAT of 540 or Compass score of 63, and admission to Teacher Education.

Used by Elementary Education majors.

MATH 2252 Data Analysis and Geometry

3 hrs.

This course offers an introduction to data analysis and statistics and the study of geometry. Included is descriptive statistics, standard and non-standard measurement, a formal and informal approach to geometry, van Hiele levels, and the use of dynamic geometry software.

PR: Math 1112 or Math ACT of 23 or Math SAT of 540 or Compass score of 63, and admission to Teacher Education

Used by Elementary Education majors.

MATH 3353 Math Methods for Elementary Teachers

3 hrs.

This course is designed to prepare pre-service elementary school teachers to teach mathematics. Students will study tools for teaching mathematics, math teaching strategies, current topics in math education, problem solving and reasoning, and assessment. Numerous laboratory experiences are required such as tutoring, micro-teaching, and construction of a NCTM Standards-based unit.

Used by Elementary Education majors.

Success rates for Service Courses

The success rate is based on the number of students passing the course with a letter grade of D or better. Each column depicts the number of students that passed and failed the service course per academic year. The last column provides the % success rate for each service course.

	Number of Students Passed or Failed/Withdrew Per Academic Year										
	2008 – 2009		2009-2010		2010-2011		2011-2012		2012-2013		
MATH Course Number	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	5-year Pass Rate (%)
1101	117	92	112	61	102	99	132	92	133	43	60.5
1102	78	9	58	17	47	14	68	17	94	4	85.2
1107	398	111	464	101	465	114	389	105	413	93	80.3
1112	364	190	366	182	324	193	326	165	322	122	66.7
1115	79	40	74	41	99	43	106	41	87	50	67.4
1170	23	5	13	2							83.7
1185	68	7	38	18	50	10	56	6	33	16	81.1
1186	24	2	10	3	22	1	18	4	20	1	89.5
2251	53	4	43	2	39	4	36	5	43	5	91.5
2252	26	1	38	8	38	6	37	4	33	0	91.1
3353	20	1	40	0	33	0	35	2	25	2	96.8

Off-campus courses

	Number of Students Passed or Failed/Withdrew Per Academic Year For Off-Campus Enrollments										
	2008 – 2009		2009-2010		2010-2011		2011-2012		2012-2013		
MATH Course Number	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	Passed	Failed/Withdrew	5-year Pass Rate (%)
1107	54	9	58	13	80	17	50	13	51	14	81.6
1112	13	7	4	12	5	17			15	1	50.0

The success rate for off-campus classes for Math 1107 was approximately the same as the total success rate. It was lower for Math 1112.

<table>
<tr><td>Cost/student credit hour</td><td>The Mathematics program costs have decreased because 1.5 senior faculty members retired in 2011-12. However, since three of the six current faculty members have been employed for thirty years or more, the cost is somewhat higher than the College Average.

College of Science and Technology
<table>
<tr><th>Academic Year</th><th>Total Cost Per Student (FTE) Equivalent</th><th>Total Cost per Student Credit Hour</th></tr>
<tr><td>2008-09</td><td>$5919</td><td>$197.30</td></tr>
<tr><td>2009-10</td><td>$5922</td><td>$197.40</td></tr>
<tr><td>2010-11</td><td>$6082</td><td>$202.73</td></tr>
<tr><td>2011-12</td><td>$5739</td><td>$191.30</td></tr>
<tr><td>2012-13</td><td>$5575</td><td>$185.83</td></tr>
</table></td></tr>
</table>

Liberal Studies Requirements Met

All four year degree programs at FSU are required to complete the institutional general studies requirements. The Mathematics Program requires students to complete these liberal studies requirements based on the criteria listed below.

THE FIRST YEAR EXPERIENCE...................... 15-16 HOURS

(To be completed within the first 45 credit hours)

(Students are required to complete all Developmental Skills courses within their first 32 credit hours.)

ENGL 1104 Written English I .... 3 Hrs

ENGL 1108 Written English II .... .3 Hrs

INFO 1100 Computer Concepts & Applications .3 Hrs (or demonstrated competency)

MATH 1102, 1107, 1112, 1115, 1185, 1190..............3 - 4 Hours

COMM 2200, 2201, 2202...3 Hours

SCIENTIFIC DISCOVERY... 8 HOURS

CULTURAL/CIVILIZATION EXPLORATION.. 9 HOURS

ARTISTIC / CREATIVE EXPRESSION & INTERDISCIPLINARY / ADVANCED STUDIES OPTION.................... 6 HOURS

SOCIETY/HUMAN INTERACTIONS... 6 HOURS

APPROVED WRITING INTENSIVE COURSE

Total Liberal Studies Credit Hours: 44-45 Hours*

***A new Liberal Studies Requirement went into effect Fall 2013. See new requirements below.**

New Liberal Studies Program

The categories were designed to incorporate the foundational knowledge and skills that have enduring societal value and to prepare students to survive and thrive in a complex, diverse, and dramatically changing world. A large portion of the skills and knowledge Fairmont State University expects its students to have when they graduate comes from general studies courses. Students must complete at least one course in each of the following general studies categories:

I.A. Critical Analysis
I.B. Quantitative Literacy
I.C. Written Communication
I.D. Teamwork
I.E. Information Literacy
I.F. Technology Literacy
I.G. Oral Communication
III. Citizenship
IV. Ethics
V. Health and Well-being
VI. Interdisciplinary and Lifelong Learning
VII.A Fine Arts
VII.B. Humanities
VII.C. Social Sciences
VII.D. Natural Sciences
VIII. Cultural Awareness and Human Dignity

• Students must complete at least 30 hours of coursework outside of their major as determined by the course prefix. See the worksheet on page 23

Year; Semester or Quarter	**Mathematics Program*** Course (Department, Number, Title)	Category (Credit Hours)		
		Professional Program Topics	Liberal Studies Requirement	Other
1st Year First Semester	English, 1104, Written English I		X(3hrs)	
	Math, 1190, Calculus I	X(4hrs)	X(4hrs)	
	Info, 1100, Comp., Con. & Apps.		X(3 hrs)	
	Liberal Studies, Civilization		X(3hrs)	
	Liberal Studies, Humanities		X(3hrs)	
1st Year Second Semester	English, 1108, Written English II		X(3hrs)	
	Math, 3315, Calculus II	X(4hrs)		
	Comp. 1102, Princ. Of Progrm. I	X(3hrs)		
	Math, 1113, Applied Statistics			X(3hrs)
	Comm 2200, Intro to Communication.		X(3hrs)	
2nd Year First Semester	Math, 3316, Calculus III	X(4hrs)		
	Math, 2212, Sets, Relations and Func	X(3hrs)		
	Engl Lit I, 2220, 2221, or 2230, World Lit		X(3hrs)	
	Chem or Physics	X(4hrs)	X(4hrs)	
	Minor choice**			X(3hrs)
2nd Year Second Semester	Math, 2200, Logic	X(3hrs)		
	Math, 3335, Probability & Statistics	X(3hrs)		
	Lab Science		X(4hrs)	
	Liberal Studies Civilization		X(3hrs)	
	Minor choice			X(3hrs)
3rd Year First Semester	Math 3363, Linear Algebra	X(3hrs)		
	Math Elective	X(3hrs)		
	Minor Choice			X(3hrs)
	Liberal Studies, Art		X(3hrs)	
	Minor Choice			X(3hrs)
3rd Year Second Semester	Math, 3361, Abstract Algebra	X(3hrs)	Writing Intensive Course	
	Math, Elective	X(3hrs)		
	Minor Choice			X(3hrs)
	Minor Choice or Elective			X(3hrs)
	Liberal Studies Humanities		X(3hrs)	
4th Year First Semester	Math Elective	X(3hrs)		
	Minor Choice or Elective			X(3hrs)
	Minor Choice or Elective			X(3hrs)
	Elective			X(3hrs)
	Liberal Studies, Art		X(3hrs)	
4th Year Second Semester	Math 3375/3391 Topology/Real Anal.	X(3hrs)		
	Minor Choice or Elective			X(3hrs)
	Minor Choice or Elective			X(3hrs)
	Minor Choice or Elective			X(3hrs)

*Beginning in Fall 2013 Degree Programs changed to 120 hours and the Math Program aligned with the change. See below.

**Note: A minor is required for a mathematics degree.

BS Mathematics Program 2013						
	Course		Credits	Program	Liberal Studies	Other
1st Year First Semester	MATH 1190	Calculus I	4	X	X	
	MATH 1125	Math Reasoning	3	X		
	ENGL 1104	Written English I	3		X	
	COMP 1102	Princ of Program. I	3	X		
	Minor/Elective	____________________	3			X
1st Year Second Semester	MATH 3315	Calculus II	4	X		
	MATH 1113	Applied Statistics	3	X		
	ENGL 1108	Written English II	3		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
2nd Year First Semester	MATH 3316	Calculus III	4	X		
	MATH 2212	Sets, Rel, & Functions	3	X		
	COMM 2200	Intro Human Comm	3		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
2nd Year Second Semester	MATH 3335	Probability & Stats	3	X		
	MATH 2200	Math Logic	3	X		
	GEOG 2210	Intro to Geography	3		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
3rd Year First Semester	Group B Math Elec	____________________	3	X		
	MATH 3362	Linear Algebra	3	X		
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
	Natural Science	Chem or Physics	4	X	X	
3rd Year Second Semester	MATH 3361	Abstract Algebra	3	X		
	POLI 1103	American Government	3		X	
	ENGL 2200	World Lit I: to 1650	3		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
4thYear First Semester	Group B Math Elec	____________________	3	X		
	Art Appreciation	Any in VIIA	3		X	
	PHED 1100	Fitness and Wellness	2		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
4th Year Second Semester	MATH 3375/3391	Topology/Real Anal.	3	X		
	Tech Lit	Tech Lit	3		X	
	Minor/Elective	____________________	3			X
	Minor/Elective	____________________	3			X
			120			

General Studies Worksheet
Mathematics Program (Beginning fall 2013)

GS Attribute	General Studies Attribute	Specific Class(es) fulfilling attribute	Course counts in general studies curriculum
IA	Critical Analysis	MATH 2212	**Math Major Course**
IB	Quantative Literacy	MATH 1190 (Math 1107 or higher in IB satisfy, but courses below Math 1190 will increase graduation hours)	**Math Major Course**
IC	Written communication	ENGL 1104*	3
ID	Teamwork	COMM 2200	3
IE	Information Literacy	ENGL 1108*	3
IF	Technology Literacy	Choice in category IF	3
IG	Oral Communication	COMM 2200 - Met in ID	X
III	Citizenship	POLI 1103 or choice in III	3
IV	Ethics	ENGL 2220 or choice in IV	3
V	Health & Well Being	PHED 1100 or choice in V	2
VI	Interdisciplinary & Lifelong Learning	POLI 1103 - Met in III or choice in VI	X
VIIA	Fine Arts	Choice in VIIA	3
VIIB	Humanities	ENGL 2220 -- MET IN IV or choice in VIIB	X
VIIC	Social Science	GEOG 2210 or choice in VIIC	3
VIID	Natural Science	Required choices: PHYS 1101/PHYS 1105/CHEM 1101/CHEM 1105	4
VIII	Cultural Awareness & Human Dignity	GEOG 2210 -Met in VIIC or choice in VIII	X
Writing Intensive Course	MATH 3361	Abstract Algebra	**Math Major Course**
		Total Hours	30

A single course can count toward only two attributes, but the hours count only once. Math majors need to earn 30 unique hours in General Studies outside of the math prefix. Students who select courses different than the recommendations should choose carefully so the total is at least 30 hours.

Assessment Requirements

The Mathematics program utilizes a departmental continuous improvement plan to meet institutional assessment needs. The continuous improvement plan consists of course assessment, programmatic assessment and program modifications that are determined necessary by outcome assessments. The purpose of the Continuous Improvement Plan (CIP) is to identify, track, and remediate programmatic weaknesses. The evaluation of competencies and program components leads to modifications of content, delivery, and other factors deemed instrumental in the pursuit of programmatic improvement.

The CIP occurs at three levels. These levels include:

- Assessment of Course Outcomes
- Assessment of Program Outcomes
- Program Modifications as determined necessary by the assessment practices.

Course Outcomes are linked to appropriate Program Outcomes (see example in Appendix A). The Course Outcomes are assessed using various tools such as course exams, assignments, quizzes, projects, labs, etc. The program has established a benchmark for each program outcome to demonstrate competency in each outcome. If the students cannot demonstrate success, a plan of improvement is established for the assessment point. These continuous improvement plans are approved by a collaborative agreement of the program faculty. An assessment matrix is established to clearly define what assessment points are evaluated in each program course. The Mathematics program has an assessment cycle of between two and four years. Each assessment point on the matrix will be assessed at least once during the assessment cycles. Additional assessments shall be conducted if warranted.

In addition, the BA in Mathematics Education is reviewed and accredited by NCATE (National Council for Accreditation of Teacher Education) every seven years. This includes the education component of the degree, as well as the mathematics component of the Mathematics Education program. Since the mathematics component is identical to the requirements for the BS in Mathematics, the program outcomes are also linked to the NCATE requirements in Mathematics Education.

All program modifications such as curriculum changes are established as a result the course and program outcome assessments and recommendations from NCATE. Any significant changes must be approved by program faculty.

Adjunct use

The Mathematics Program has employed 15 adjunct faculty members at some time during the last five years to assist in the offering of some Mathematics courses. Adjuncts have only been used to teach support courses: Math 1101 and 1102, Tech Math I and II; Math 1107, the general studies math course; Math 1112, College Algebra; and Math 1185 and 1186, Applied Calculus I and II. Math 1101, 1102, 1107, and 1112 are coordinated by full-time math faculty. The coordinator for each course supplies the syllabus, books, and a handbook describing the philosophy and instructor expectation for the course. Current handbooks appear in Appendix C. The coordinator also designs and tabulates the assessments for those classes. A full-time faculty member supplied teaching materials for Math 1185 and 1186. Below is a list and descriptor of the adjunct usage.

A faculty data profile form has been completed for each adjunct member and is included in Appendix B.

Below is the average enrollment data for the last two years for each adjunct.

Note: Off-campus class offerings and enrollment number requirements are determined by Pierpont Community and Technical College. FSU approves faculty and coordinates all content.

Martina Bachlechner

Course Number and Title	When Taught	Average Enrollment
Math 1185: Applied Calculus I	Fall 2010	13 students per semester
Math 1186: Applied Calculus II	Spring 2011	11 students per semester

Patricia Bush

Course Number and Title	When Taught	Average Enrollment
MATH 1107 Fundamental Concepts of Mathematics	Spring 2010 Spring 2011	14 students per semester

Adjunct use (Continued)

Robert Clonch

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1107 Fundamental Concepts of Mathematics	Fall 2012	60 students
MATH 1112 College Algebra	Spring 2007	15 students

Victor Daniel

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1107 Fundamental Concepts of Mathematics	Spring 2012	24 students
MATH 1112 College Algebra	Spring 2013	11 students

Rusty Devito

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1112 College Algebra	Fall 2011 Fall 2012	17 students

S. Nelson Elliot

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1107 Fundamental Concepts of Mathematics	Fall 2011 Spring 2012	62 students

Adjunct use (Continued)

Francisco Luttecke		
Course Number and Title	**When Taught**	**Average Enrollment per semester**
MATH 1107 Fundamental Concepts of Mathematics	Spring 2012 Summer 2012 Spring 2013 Summer 2013	20 students

Larry Mason		
Course Number and Title	**When Taught**	**Average Enrollment per semester**
MATH 1101 Applied Technical Math I	Spring 2012 Fall 2012 Spring 2013	31 students
MATH 1102 Applied Technical Math II	Fall 2011 Spring 2012 Fall 2012 Spring 2013	23 students

Jeff Noel		
Course Number and Title	**When Taught**	**Average Enrollment per semester**
MATH 1101 Applied Technical Math I	Fall 2011 Spring 2012	29 students
MATH 1102 Applied Technical Math II	Spring 2012	38 students
MATH 1185 Applied Calculus I	Fall 2011	7 students
MATH 1107 Fundamental Concepts of Mathematics	Summer 2013	12 students
MATH 1112 College Algebra	Summer 2013	12 students

Adjunct use (Continued)

Dan Solomon

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1107 Fundamental Concepts of Mathematics	Fall 2011	30 students
MATH 1112 College Algebra	Fall 2011	25 students

Grant Spencer

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1101 Applied Technical Math I	Fall 2011 Fall 2012	23 students
MATH 1107 Fundamental Concepts of Mathematics	Fall 2011 Spring 2012 Fall 2012 Spring 2013	23 students
MATH 1112 College Algebra	Fall 2011 Spring 2012 Summer 2012 Fall 2012 Spring 2013 Summer 2013	18 students

Merle Thomas

Course Number and Title	When Taught	Average Enrollment per semester
MATH 1101 Applied Technical Math I	Spring 2012 Summer 2012 Spring 2013	11 students
MATH 1102 Applied Technical Math II	Fall 2012	6 students

Adjunct use (Continued)

Paula Vilone		
Course Number and Title	**When Taught**	**Average Enrollment per semester**
MATH 1112 College Algebra	Fall 2012 Spring 2013	57 students

Brittany Vincent		
Course Number and Title	**When Taught**	**Average Enrollment per semester**
MATH 1107 Fundamental Concepts of Mathematics	Fall 2012	12 students
MATH 1186 Applied Calculus II	Spring 2012	9 students

Graduation/Retention Rates

Over the past five years the Mathematics program has graduated a total of 54 students, averaging 10.8 graduates per year. This includes students that have graduated with a Mathematics BS, an Education with a 5-Adult Math Teaching Field BA or an Education Degree with a 5-9 Math Specialization BA. The institution does not track minors. Below is a table summarizing the graduation data on a yearly basis.

Academic Year	Number of Graduates obtaining BS	Number of Graduates obtaining BA With Math Teaching Specialization	Number of Students Obtaining a 5-9 Math Teaching Certification	Total Students Graduated
2008-09	8	2	1	11
2009-10	5	0	1	6
2010-11	7*	0	7	14
2011-12	8	0	2	10
2012-13	9*	0	4	13
Total Number over 5 years	37	2	15	54
***Includes 1 MAT student**				

Previous Program Review Results

The 2008 program review for Mathematics recommended that the B.S. degree in Mathematics be continued. Our Mathematics Program for both the 5-adult and 5-9 mathematics specializations are fully accredited by NCATE.

A copy of the approval is provided as Appendix F for reference purposes.

ADEQUACY (§ 4.2.4.2)

Curriculum

Program requirements include a foundation of twelve hours of calculus and six hours of logic and concepts related to sets relations, and functions which underlie nearly all of mathematics. The Abstract Algebra and Linear Algebra courses provide exposure to basic algebraic structures and more techniques for problem solving. The Probability and Statistics course adds breadth to the student's core of knowledge in an increasingly important and applicable area of applied mathematics. Electives broaden the students' exposure to various areas of mathematics and allow students to tailor their degree to their interests and intended post-college pursuit. Every student is required to take one of the two capstone courses: Real Analysis or Topology. Graduates with a mathematics degree find employment in a variety of fields. Because of this fact, all majors complete a minor to be better prepared for their post-college career.

As of 2006, all Math Education majors are required to complete a major in their field. Thus all of these majors complete the requirements for a B. S. in mathematics in addition to a B. A. in education. The completion of these two degrees leads to a math teaching certification in 5-adult Mathematics. The Math Ed. majors are required to take Discrete Mathematics and Modern Geometry which satisfy their math elective requirement. In addition, they take a course on methods for teaching mathematics taught by the Math Department. The students who opt for this combination use Education as their minor for the Mathematics Degree and are able to do both in four years. Another option for Education students is a 5-9 teaching specialization in Mathematics. This must be added to another certification such as Elementary Education or English, 5-adult.

Computer Science majors are required to take Calculus I and II, Discrete, and Probability and Statistics. With the addition of only two more mathematics courses, these students are able to complete a minor in mathematics.

Our program design is supported by guidelines from the American Mathematical Society, © 2012. These guidelines are coordinated with our math courses below. Notice that Math 1113 and Math 1125 changed from" recommended" to "required" in the new program beginning in Fall 2013 based on assessment analysis. (See program sheets pages 25-27)

Chapter 6 Appendix: Sample Undergraduate Mathematics Sequences

Long sequence (42 semester-hours).

I Courses taken by undergraduates in a variety of majors (21 semester hours)
1190, 3315, 3316 – Single- and Multi-variable Calculus (9+ semester-hours)
3362 – Introduction to Linear Algebra (3 semester-hours)
1102 – Introduction to Computer Programming (3 semester-hours)
1113, 3335 – Introduction to Statistics I, II (6 semester-hours)

II Courses intended for all mathematics majors (12 semester-hours)
2212 – Introduction to Proofs (3 semester-hours)
3375 or 3391– Advanced Calculus (3 semester-hours)
3361 – Abstract Algebra (3 Semester-hours)
2216 – Geometry or Mathematical Modeling (3 semester-hours)

III Courses designed primarily for prospective teachers (9 semester-hours).
1125 – Math Reasoning: Reading and Writing
2200 – Mathematical Logic
3372 – Modern Geometry

Program Requirements:

Liberal Studies	32-42	37 hrs	ENGL 1104 – 3 hrs ENGL 1108 – 3 hrs COMM 2200 – 3 hrs INFO 1100 – 3 hrs MATH 1190 – 4 hrs (counted below) CHEM or PHYS – 4 hrs (counted below) Any Lab Science – 4 hrs. Artistic/Creative – 6 hrs. Society/Human – 6 additional hrs. Cultural Civilization - 9 hrs	
Major	32-65	43 hrs	MATH 1190 – 4 hrs MATH 2200 – 3 hrs. MATH 2212 – 3 hrs. MATH 3315 – 4 hrs. MATH 3316 – 4 hrs. MATH 3335 – 3 hrs. MATH 3361 – 3 hrs. MATH 3362 – 3 hrs. MATH 3375 or MATH 3391 – 3 hrs PHYS or CHEM– 4 hrs COMP 1102 – 3 hrs	2 courses from below MATH 2206 MATH 2216 MATH 3342 MATH 3372 MATH 4401 ------ 6 hrs
Minor		18-24 hrs	A minor is required for a Mathematics degree	
Electives	min 21	24-30 hrs		
TOTAL	max 128	_128_hrs		

Faculty Data

The Mathematics Program at Fairmont State University currently maintains six (6) full-time faculty members, two (2) faculty from other programs with some teaching duties in Mathematics, and has had the support of fifteenteen (15) adjunct faculty during the 5 years included in this program review. Two Mathematics faculty members retired and were replaced during the five-year period.

Full –time Faculty:

Randall L. Baker, M.S. (a two-course assignment in Mathematics)
Brian S. Blackwood, Ph.D.
James O. Dunlevy, M.S.
Susan L. Goodwin, Ed.D.
Alice D. LaRue, M.S.
Steven T. Morrow, Ph.D.
Joseph A. Riesen, Ph.D.

Full-time Faculty with Mathematics Teaching Duties:

Donald S. Haynes, Ph.D.
Theodore K. LaRue, M.S.

Retired Full-time Faculty:

Melanie J. Harris, Ph.D.
Ashley M. Martin, III, Ph.D.

Adjunct Faculty:

Martina Bachlechner
Patricia J. Bush, M.A.
Robert Clonch, M.A.
Victor W. Daniel, Ph.D
Russelle L. DeVito, M.A.
Samuel N. Elliott, III, M.A.
Francisco J. Luttecke, Ph.D.
Larry W. Mason, M.A.

Jeffrey Noel, M.S.

Daniel L. Solomon, M.A.

Grant D. Spencer, M.A.

Merle Thomas, Jr., M.S.

Paula L. Vilone, M.A.

Brittany L. Vincent, M. S.

Kevin Wright, M.A.

A faculty data sheet has been completed for each faculty member and provided in Appendix B of this document.

Accreditation/national standards

The Mathematics Program obtained full accreditation from NCATE after a complete program review in 2012. In addition, the 5-9 program also obtained full accreditation. The following strength of both programs was cited: *The institution is commended developing outcomes for required courses and providing assessment data through TaskStream.*

A complete copy of the NCATE Criteria and response is provided as Appendix F of this report.

NECESSITY (§ 4.1.3.3)

Placement and Success of Graduates

Based on our graduate contacts and graduate surveys, approximately 91 percent of the students are either successfully employed in the field mathematics/mathematics education or are attending graduate school full time. In addition, approximately 95 percent of the graduates are employed or attending graduate school in West Virginia.

Below is a summary of graduates and placement.

Graduate Status of those surveyed (23 responses)	Number of Graduates	Percentage of Graduates
Full time permanent position in education, teaching mathematics	15	65.2 %
Graduate School at WVU, full time	5	21.7 %
Seeking permanent position in mathematics education	1	4.3 %
Employed in mathematics related field (insurance)	1	4.3 %
Employed outside the field of mathematics	1	4.3 %

Similar Programs in WV

Geographically, the nearest state college with a comparable degree is West Liberty, which is approximately a two-hour drive from Fairmont. West Virginia University, 20 miles away, has a comparable program but lacks the intimate, supportive atmosphere of our program.

All similar programs offered a state institutions of higher learning are listed below:

- Concord University
- Marshall University
- Shepherd University
- West Virginia State University
- West Liberty University
- WVU Tech
- West Virginia University

CONSISTENCY WITH MISSION (§ 4.1.3.4)

FAIRMONT STATE UNIVERSITY has established the following mission statements:

MISSION STATEMENT: The Mission of Fairmont State University is to provide opportunities for individuals to achieve their professional and personal goals and discover roles for responsible citizenship that promote the common good.

VISION STATEMENT: Fairmont State University aspires to be nationally recognized as a model for accessible learner-centered institutions that promote student success by providing comprehensive education and excellent teaching, flexible learning environments, and superior services. Graduates will have the knowledge, skills, and habits of mind necessary for intellectual growth, full and participatory citizenship, employability, and entrepreneurship in a changing environment.

COLLEGE OF SCIENCE AND TECHNOLOGY
Mission:

Our mission is to promote effective student learning in science, math and technology and to prepare top-quality graduates for their future endeavors, including graduate study, employment or other personal goals.

MATHEMATICS PROGRAM

Mission:

The mission of the mathematics degree programs is to equip students with analytic and problem solving skills for careers and graduate work. Classes develop student abilities and aptitudes to apply mathematical methods and ideas not only to problems in mathematics and related fields such as the sciences, computer science, actuarial science, or statistics, but also to virtually any area of inquiry. Students learn to communicate ideas effectively and to digest new information and concepts independently. Students are encouraged to develop intellectually and to become involved with professional organizations. The department cooperates fully with the School of Education in meeting its mission for candidates for an A.B. degree in education with mathematics teaching specialization for either the 5-9 or the 5-Adult grade levels.

Objectives:

The Program Objectives are intended to dynamically promote professional competencies and continued professional growth.

Below are the Program Objectives for the Mathematics program at Fairmont State University.

Students and graduates shall be able to:

1	Demonstrate basic manipulative skills in algebra, geometry, trigonometry and beginning calculus.
2	Apply the underlying unifying structures of mathematics (i.e., sets, relations and functions, logical structure) and the relationships among them.
3	Demonstrate proficiency in writing proofs.
4	Communicate mathematical ideas both orally and in writing.
5	Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods.
6	Investigate and solve unfamiliar math problems.

The Mathematics Program mission supports that of the University. The Math Program objectives form the foundation to achieve the goal of producing graduates with the skills and attitudes to be independent, lifelong learners and to prepare them for further education and rewarding careers. For many years, the mathematics program at Fairmont State has been respected academically because of the quality of its faculty and its graduates. The Bachelor of Science in Mathematics is academically sound, is supported by a strong, well-credentialed faculty who are committed to academic excellence and has produced graduates who are able to compete successfully in graduate school and in their chosen careers.

Relationship with Other Programs and the Community

The Mathematics program has an excellent relationship with the other programs. The department worked in conjunction with Technology to design mathematically rigorous courses that support and coordinate with their programs. It also worked with Chemistry and Biology to design a calculus course that fit with their vision. The faculty makes an exceptional effort to insure that students enroll in the mathematics class best suited for them and their major.

Both faculty and students tutor on campus and in the community. They also serve in various capacities for academic competitions.

Signatures and Recommendations

The required sheet with signatures and recommendation are provided on page 1.

Tab 3

Appendix A

Mathematics Program Outcomes Aligned with MATH 3361 Abstract Algebra Outcome Set

MATH 3361 ABSTRACT ALGEBRA

	Outcomes					
	Outcome 1 Identify and analyze groups, including familiar subsets of the real numbers.	**Outcome 2** Identify and analyze subgroups, including using some concepts from basic number theory to determine possible sizes and types of subgroups.	**Outcome 3** Identify and analyze functions from one group to another, relating properties of functions to images or pre-images of groups and subgroups.	**Outcome 4** Recognizing reasoning and proof as fundamental, apply a variety of techniques for proving theorems.	**Outcome 5** Read, digest, make conjectures and prove propositions about, and apply mathematical material that is new to the student.	**Outcome 6** Communicate mathematics effectively both orally and in writing to peers and faculty.
B.S Math Program Outcomes Upon successful completion of this program, students will be able to:						
B.S. Math Program Outcome 1 Demonstrate basic manipulative skills in algebra, geometry, trigonometry and beginning calculus.						
B.S. Math Program Outcome 2 Apply the underlying unifying structures of mathematics (i.e., sets, relations and functions, logical structure) and the relationships among them		[View Detail]	[View Detail]			
B.S. Math Program Outcome 3 Demonstrate proficiency in writing proofs				[View Detail]		
B.S. Math Program Outcome 4 Communicate mathematical ideas both orally and in writing						[View Detail]

B.S. Math Program Outcome 5 Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods						
B.S. Math Program Outcome 6 Investigate and solve unfamiliar math problems					[View Detail]	

This is an example of one course's alignment with Program Outcomes.

Tab 4

Appendix B

Faculty Data Sheets

Faculty Data

Name: Randy Baker Rank : Assistant Professor

Check One Full-time X Part-time ______ Adjunct ______ Graduate Asst. ______

Highest Degree Earned M.S . Date Degree Received 1985

Conferred by West Virginia University

Area of Specialization Numerical Analysis; Combinatorics

Professional registration/licensure ______ Yrs. of employment at present institution 27

Years of employment in higher education 28 Yrs. of related experience outside higher education 1

Non-teaching experience 1

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 11	COMP 1102 Principles of Programming I	22
F 11	COMP 1108 Principles of Programming II	8
F 11	MATH 1101 Applied Tech Mathematics I	26
F 11	MATH 1185 Applied Calculus I	11
S 12	COMP 1102 Principles of Programming I	22
S 12	COMP 3300 Computer Graphics	9
S 12	MATH 1185 Applied Calculus I	23
S 12	MATH 3391 Real Analysis	14
F 12	COMP 1102 Principles of Programming I	18
F 12	COMP 1108 Principles of Programming II	10
F 12	MATH 1185 Applied Calculus I	15
F 12	MATH 2212 Sets, Relations and Functions	15
S 13	COMP 1102 Principles of Programming I	21
S 13	COMP 3300 Computer Graphics	8
S 13	MATH 1107 Fundamental Concepts of Math	29
S 13	MATH 1185 Applied Calculus I	12

(b) If degree is not in area of current assignment, explain.

(c) Identify your professional development activities during the past five years.

- Fairmont State University: Arranged a demonstration / discussion of Mathematica software ("Mathematica 7 Up Close and Personal") 2009
- Webinar: "What's New in Mathematica 6" 2009
- Webinar: "A Technical Overview of Mathematica 6" 2009
- Webinar: "The Wolfram Demonstration Project : Creating Mathematica Demonstrations" 2009
- Participant: MyMathLab seminar 2009

- Participant: WVMATYC Annual meeting 2009
- Participant: Youngstown State University Regional Pi Mu Epsilon Conference 2009
- Participant: Texas Instruments TI-Nspire workshop 2010
- Webinar: "What's New in Mathematica 8"   2010
- Webinar: "Topics in First Year Calculus".   2010
- Webinar: "Advanced Techniques in Mathematica 8" 2011
- Participant: HEPC Presentation on Developmental Math in WV 2012
- Engineering Challenge: Non-Programming Contest 2013
- Participant: Four-day Amatyc Traveling Workshop on Developmental Education 2013
- Participant: West Virginia Developmental Education Summit 2013

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : _______Brian Blackwood_______________ Rank: ___Assistant Professor________________

Check One: Full-time _X_ ___ Part-time _____ Adjunct _____ Graduate Asst. ______________________

Highest Degree Earned ____Ph.D.____________ Date Degree Received ____2008____ __________________

Conferred by _________Ohio University________________________________
Area of Specialization _Mathematics (Applied Linear Algebra and Noncommutative Ring Theory)_____
Professional registration/licensure ____ _ _ _
Years of employment in higher education __5___ Yrs. of related experience outside higher education ________
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1107 Fund Concepts of Mathematics	29
F 12	MATH 1107 Fund Concepts of Mathematics	30
F 12	MATH 1112 College Algebra	30
F 12	MATH 1190 Calculus I	22
F 12	MATH 1190 Calculus I (Honors)	9
S 13	MATH 1107 Fund Concepts of Mathematics	30
S 13	MATH 1107 Fund Concepts of Mathematics	24
S 13	MATH 3315 Calculus II	23
S 13	MATH 3315 Calculus II (Honors)	9
S 13	MATH 3375 Topology	6
F 13	MATH 1107 Fund Concepts of Mathematics	25
F 13	MATH 1112 College Algebra	26
F 13	MATH 1112 College Algebra	27
F 13	MATH 3316 Calculus III	15
S 14	MATH 1107 Fund Concepts of Mathematics	30
S 14	MATH 1107 Fund Concepts of Mathematics	16
S 14	MATH 1185 Applied Calculus I	23
S 14	MATH 3361 Abstract Algebra	13

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

- Engineering and Science Challenge, Fairmont State University (September 20, 2013)
- Attended the Blue Ribbon Mathematics Partnership Meeting in Fairmont, WV on September 11, 2013.
- Attended the AMATYC Workshop in Fairmont, WV, May 20-22, 2013.
- Attended the Common Core State Standards Workshop for Higher Education in Flatwoods, WV on April 3, 2013.
- Attended “Denial Is Not a Strategy: Accepting What Your College Algebra Students Don’t Know” on March 18, 2013.
- Attended the Blue Ribbon Mathematics Partnership Meeting in Morgantown, WV on March 13, 2013.

- Wrote and graded the Team Power Question for 2013 RESA VII Math Field Day, Robert C. Byrd High School, Clarksburg, WV (March 2, 2013)
- Youngstown State University Regional Pi Mu Epsilon Conference in Youngstown, OH on February 23, 2013.
- Attended the WV Developmental Education Initiative in Fairmont, WV on January 11, 2013.
- Attended the Experiencing Math and Technology Workshop (Improving Outcomes Through Technology) in Farmington, PA (November 30, 2012).
- Attended the Math Study Skills with Alan Bass web seminar on October 26, 2012.
- Attended the Blue Ribbon Mathematics Partnership Meeting in Fairmont, WV on October 24, 2012.
- Engineering and Science Challenge, Fairmont State University (September 21, 2012).
- "An Introduction to Finite Fields and Coding Theory", WVCTM 2012 Annual Conference, March 16-17, 2012.
- Wrote the Math Field Day Exam for Regional Math Field Day and organized the Regional Math Field Day event at Potomac State College (Spring 2011)
- Attended MathFest 2010 in Pittsburgh, PA (August 5-7, 2010). Attended the "Effective Placement Testing for Introductory College Mathematics Course" Minicourse.
- Wrote the Regional Math Field Day Exam and organized the Regional Math Field Day event at Potomac State College (Spring 2009).

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

Assessed outcomes in Math 1107, 1112, 3315, 3375

(f) List professional books/papers published during the last five years.

- Shorted Operators Relative to a Partial Order in a Regular Ring, Communications in Algebra, Volume 37, Issue 11, November 2009, pages 4141 – 4152 (with S. K. Jain, K. M. Prasad and A. Srivastava).
- Potomac State College of WVU Math 90 Problem Set, Xanedu, July 1, 2009 (with Gary Seldomridge).
- Nonnegative Group Monotone Matrices and the Minus Partial Order, Linear Algebra and its Applications, Volume 430, Issue 1, January 2009, pages 121-132 (with S.K. Jain).
- A Study of Partial Orders on Nonnegative Matrices and von Neumann Regular Rings, Dissertation, August 2008

(g) List externally funded research (grants and contracts) during last five years.

None

Faculty Data

Name: James O. Dunlevy__________________Rank: Associate Professor______________________________

Check One: Full-time _X__ Part-time _____ Adjunct _____ Graduate Asst. ___________________________

Highest Degree Earned ____MA___________ Date Degree Received _1965

Conferred by ____Arizona State University________________________________
Area of Specialization Mathematics________________

Professional registration/licensure ___ Yrs. of employment at present institution __45_____
Years of employment in higher education _48___ Yrs. of related experience outside higher education _____
Non-teaching experience_____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
Spring 2012	Math 1112 College Algebra	23
Spring 2012	Math 1190 Calculus I	19
Spring 2012	Math 1190 Calculus – Honors	2
Spring 2012	Math 3335 Probability and Statistics	8
Spring 2012	Math 2200 Mathematical Logic	29
Fall 2012	Math 1112 College Algebra	30
Fall 2012	Math 1115 Trigonometry & Elem. Functions	29
Fall 2012	Math 1190 Calculus I	19
Fall 2012	Math 1190 Calculus I – Honors	8
Fall 2012	Math 2216 Intro. to Discrete Math	27
Spring 2013	Math 1112 College Algebra	29
Spring 2013	Math 1115 Trigonometry & Elem. Functions	26
Spring 2013	Math 1190 Calculus I	20
Spring 2013	Math 1190 Calculus I – Honors	3
Spring 2013	Math 2200 Mathematical Logic	34
Fall 2013	Math 1112 College Algebra	23
Fall 2013	Math 1115 Trigonometry & Elem. Functions	23
Fall 2013	Math 1190 Calculus I	19
Fall 2013	Math 1190 Calculus I – Honors	11
Fall 2013	Math 2216 Intro. to Discrete Math	28

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

Received training in the use of Mimio software in 2012 and used it in the spring of 2013.
In May of 2013, participated in a workshop to produce FSU courses in developmental math.
In 2013, received training in the use of the Ipad .
Subscribe to and read The College Mathematics Journal and The Mathematics Magazine.
Borrow and read the AMATYC journal.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

Created questions for use in the Engineering Challenge: Math Trivial Pursuit 2009-2011
Created online quizzes in Blackboard for use in my College Algebra and Trigonometry Classes.
Helped with the administration of Engineering Challenge: Math Scavenger Hunt 2012-2013

(f) List professional books/papers published during the last five years.

(g) List externally funded research (grants and contracts) during last five years.

Faculty Data

Name : _______Susan Goodwin_______________ Rank: _______Professor_______________________

Check One: Full-time __X___ Part-time _____ Adjunct _____ Graduate Asst. ____________________

Highest Degree Earned ____Ed. D.____________ Date Degree Received ____1997____

Conferred by _________West Virginia University_________________________________
Area of Specialization _____Math Education_________________

Professional registration/licensure __X__ Yrs. of employment at present institution ____25____
Years of employment in higher education ___36___Yrs. of related experience outside higher education____5____
Non-teaching experience _____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1112 College Algebra	20
F 12	MATH 1113 Applied Statistics	23
F 12	MATH 2251 Structure of the Real Numbers	24
F 12	MATH 2252 Data Analysis and Geometry	16
F 12	MATH 3353 Math Methods for Elem. Teachers	16
F 12	MATH 4431 Methods and Materials in Teaching Math	8
S 13	MATH 1115 Trig and Elementary Functions	14
S 13	MATH 1113 Applied Statistics	30
S 13	MATH 2251 Structure of the Real Numbers	24
S 13	MATH 2252 Data Analysis and Geometry	17
S 13	MATH 3353 Math Methods for Elem. Teachers	11
F 13	MATH 1112 College Algebra	20
F 13	MATH 2251 Structure of the Real Numbers	20
F 13	MATH 2252 Data Analysis and Geometry	20
F 13	MATH 3353 Math Methods for Elem. Teachers	18
F 13	MATH 4431 Methods and Materials in Teaching Math	11
S 14	MATH 1115 Trig and Elementary Functions	14
S 14	MATH 1113 Applied Statistics	27
S 14	MATH 2251 Structure of the Real Numbers	15
S 14	MATH 2252 Data Analysis and Geometry	22
S 14	MATH 3353 Math Methods for Elem. Teachers	20

If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(b) Identify your professional development activities during the past five years.

- Presentation: WV Council of Teachers of Mathematics Conference "A is for Applet" 2009
- Presentation: Texas Instruments T3 Conference "Exploring Patterns with the TI-15" 2009
- Presentation: WV Council of Teachers of Mathematics Conference "Exploring Patterns with the TI-15" 2010
- Presentation: WV Council of Teachers of Mathematics Conference "Polygons, Anglegs, and Graphic Organizers" 2011
- Presentation: WV Council of Teachers of Mathematics Conference "Billiards: The Bridge between Geometry and Factors" 2012
- WV Council of Teachers of Mathematics, VP 2008 - 2011
- Conducted FE review in Statistics 2010 – 2013
- Hosted Blue Ribbon Math Committee 2011-2014
- Created and graded the Team Power Question for Regional Math Field Day 2012
- Collected and analyzed data for NCATE reports 2008-Present
- Engineering Challenge: Math Trivial Pursuit 2009-2011
- Engineering Challenge: Math Scavenger Hunt 2012-2013
- Fairmont State University: Common Core Math Presentation 2012
- Conducted Mimio Training 2012
- Webinar: Math Study Skills with Alan Bass 2012
- Participant: HEPC Presentation on Developmental Math in WV 2012
- Participant: Blackboard 9.1 Training 2012
- Participant: Four-day Amatyc Traveling Workshop on Developmental Education 2013
- Coordinator Math 1101 and 1102, Applied Technical Mathematics
- WvEB Algebra/Trig Higher Ed Advisory Committee 2009-present
- NCATE Math Ed program reaccredited
- Participant: Ipad Training 2013
- Supervised Math Student Teachers 2008-2013

(c) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

- West Virginia Council of Teachers of Mathematics 2008 College Teacher of the Year Award

(d) Indicate any other activities which have contributed to effective teaching.

- Assessed all outcomes in Math 2251, 2252, 3353, 4431
- Created Statistics Mimio Lessons

(e) List professional books/papers published during the last five years.

None

(f) List externally funded research (grants and contracts) during last five years.

None

Faculty Data

Name : _______Alice Dennine LaRue______________ Rank: _______Assistant Professor__________

Check One: Full-time__X ___ Part-time _____ Adjunct _____ Graduate Asst. ____________________

Highest Degree Earned ____M.S. Date Degree Received ___1984____

Conferred by _________West Virginia University________________________________
Area of Specialization ______Mathematics____
Professional registration/licensure_X_ Yrs. of employment at present institution _24_
WV Permanent Teacher Certification for Math 5-12 and Journalism 7-12
Years of employment in higher education __24____Yrs. of related experience outside higher education____10____
Non-teaching experience _3______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1112 College Algebra Honors	18
F 12	MATH 1112 College Algebra	9
F 12	MATH 1112 College Algebra	28
F 12	MATH 1115 Trigonometry & Elementary Functions	27
F 12	MATH 3372 College Geometry	14
S 13	MATH 1112 College Algebra	14
S 13	MATH 1115 Trigonometry & Elementary Functions	27
S 13	MATH 1107 Fundamental Concepts of Math	28
S 13	MATH 1107 Fundamental Concepts of Math	16
S 13	MATH 1107 Fundamental Concepts of Math Honors	8
F 13	MATH 1112 College Algebra Honors	15
F 13	MATH 1115 Trigonometry & Elementary Functions	26
F 13	MATH 1199 Math Reasoning: Reading & Writing	11
S 14	MATH 1115 Trig and Elementary Functions	28
S 14	MATH 1112 College Algebra	28
S14	MATH 1112 College Algebra	25
S 14	MATH 1107 College Algebra	18

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

- WVMATYC-- West Virginia Mathematical Association of Two Year Colleges conference 2009
- AMATYC 34th National Conference Fall 2008
- Blue Ribbon Mathematics Partnership Meetings
- 2013 MAA Allegheny Mountain Meeting at Indian University of Pennsylvania April 6, 2013
- Organized and attended workshops on "Using MyMathLab for College Algebra."
- Book review: Pearson Book Publishers Diary Review of the textbook "College Algebra: An Early Functions Approach."
- Book Review: Blitzer Consumer Mathematics Review for Chapter 8 from Thinking Mathematically.
- WV Council Teachers of Mathematics Annual Conference meetings

- Presenter: WVCTM conference March 15, 2013 Kinesthetic activities for arithmetic and composition of functions.
- Presenter: WVCTM conference March 19, 2010 -- Graph Analysis and Transformations.

- WV Developmental Taskforce
  - June 5-7, 2012 -- WV Developmental Taskforce Workshop for Mathematics
  - Member of the WV Developmental Task Force.
  - HEPC Statewide Developmental Education Meeting Oct. 25, 2012
  - HEPC presentation about Developmental Math in WV on Jan. 11, 2013
  - West Virginia Education Summit June 5-6, 2013.
  - Prepared support class parallel content for AMATYC Traveling Conference.
- Scholarly Readings
  - Fall 2011 - Math 1112 Honors students researched Feuds in Mathematics.
  - Math 1112 honors section Fall 2013, popular book about game theory "Rock, Paper, Scissors."
  - Read the FSU common reading book for 2011-2012. -- "Year of Wonders" by Geraldine Brooks
  - Studied American Mathematical Society 2012 report on the Mathematics Education of Teacher
  - Continued to read journals concerning math pedagogy, math topics, or developmental education.
  - Researched Voting methods in preparation to teach topic in honors section of Math 1107.
  - Read book "Henrietta Lacks." Attended the Celebration of Ideas with the author, Rebecca Skloot.
- Lecture: Attended Celebration of Ideas lecture by Michele Norris
- Participant: Suicide Prevention Workshop Oct. 8, 2010
- Participant: Attended HEPC Liberal Arts Math Symposium December 2009
- Participant: Attended Transition Mathematics for Seniors Professional Development sponsored by WVDE March , 2010
- Participant: Attended T^3 "Getting Started with TI-Nspire High School Mathematics" June 22-25, 2010.
- Participant: October 25, 2011 -- WVDE Workshop about Reasoning and Making Sense
- Participant: December 1, 2011-- Webex by Taskstream about Learning Outcomes
- Participant: Fall 2012 -- Blackboard 9.1 Training, Math Content Standards, National Science Standards
- Participant: Oct 26, 2012 - Webinar Math Study Skills
- Participant: Spring 2012 -- Disability Etiquette, Blackboard 9 Preview, Teamwork Workshop
- Participant: Ipad Training 2013

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

West Virginia Council of Teachers of Mathematics 2012 College Teacher of the Year Award

(e) Indicate any other activities which have contributed to effective teaching.

- WV Council of Teachers of Mathematics, VP 2013- present
- Coordinated all Math 1107, 1112, 1115 sections.
- Created Mimio Lessons for Math 1107, 1112, 1115, 1125, 3372
- Member of West Virginia State Math Field Day Organization. This organization organizes and administers the West Virginia State Math Field Day competition for students in grades 4-12. I serve as secretary/historian.
- Proofed Region 7 Team power question and made suggestions for improvement.
- Prepared curriculum proposal for Math 1125-Mathematical Reasoning: Reading and Writing.
- Collected Data on Math 1112 classes - overall grade distributions.

(f) List professional books/papers published during the last five years.

None

(g) List externally funded research (grants and contracts) during last five years.

None

Faculty Data

Name: _______Steven Morrow______________________ Rank: _______Assistant Professor_______

Check One: Full-time __X_ __ Part-time _____ Adjunct _____ Graduate Asst. ____________________

Highest Degree Earned ____Ph. D.____________ Date Degree Received ____2012____ __________________

Conferred by ________Indiana University________________________________
Area of Specialization ___Mathematics _________________

Professional registration/licensure __X__ Yrs. of employment at present institution ____1____
Years of employment in higher education ___1___ Yrs. of related experience outside higher education___ ____
Non-teaching experience ___7____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1101 Applied Technical Math 1	29
F 12	MATH 1115 Trig and Elementary Functions	14
F 12	MATH 1107 Fundamental Concepts of Math	29
F 12	PHYS 1101 Introduction to Physics	31
F 12	PHYS 1101 Physics 1 Lab	17
F 12	PHYS 1101 Physics 1 Lab	18
S 13	MATH 1102 Applied Technical Math 2	29
S 13	MATH 3335 Probability and Statistics	11
S 13	MATH 1107 Fundamental Concepts of Math	13
F 13	MATH 1101 Applied Technical Math 1	30
F 13	MATH 1113 Applied Statistics	27
F 13	MATH 1185 Applied Calculus 1	19
F 13	MATH 3342 Numerical Methods	5
S 14	MATH 1102 Applied Technical Math 2	24
S 14	MATH 1102 Applied Technical Math 2	19
S 14	MATH 3391 Real Analysis	13
S 14	MATH 1186 Applied Calculus 2	18

(b) If degree is not in area of current assignment, explain.

Degree is in area of current assignment for mathematics.
(I taught Physics in Fall, 2012 due to a faculty illness.)

(c) Identify your professional development activities during the past five years.

- Attended Blue Ribbon Math Committee Meetings at Fairmont State in 2012 and 2013
- Participated in 3-day Developmental Mathematics workshop and planning for future FSU courses in developmental math.

- Attended “Effects” Training workshop where several speakers presented examples of hands-on classroom techniques
- Serving on the Faculty Welfare Committee and Technology Subcommittee for 2013-2014
- Participated in Engineering Challenge: Math Scavenger Hunt 2012-2013 for the College’s recruitment day.
- Participated in Ipad Training (2013)

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

Speaker at the American Math Society Fall Sectional meeting held at University of Louisville, October, 2013

(e) Indicate any other activities which have contributed to effective teaching.

- Learned software to be used in three different classes: Python, Mathcad, and Minitab
- Participated in Assessment of outcomes in Math 1107, 1101, 1102, and 3335

(f) List professional books/papers published during the last five years.

None

(g) List externally funded research (grants and contracts) during last five years.

None

Faculty Data

Name : __Joseph Riesen__________________ Rank: ____Professor__________________________

Check One: Full-time ___X___ Part-time _____ Adjunct _____ Graduate Asst. ____________________

Highest Degree Earned ___Ph.D.____________ Date Degree Received _____December 1993__

Conferred by ________Northwestern University_______________________________________
Area of Specialization ___Group Cohomology____________________

Professional registration/licensure ____ Yrs. of employment at present institution _21______
Years of employment in higher education __21_ Yrs. of related experience outside higher education ______
Non-teaching experience ___

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 11	Math 1185 Applied Calculus I	20
F 11	Math 1190 Calculus I	24
F 11	Math 1102 Applied Technical Math II	16
F 11	Math 3362 Linear Algebra	17
S 12	Math 3315 Calculus II	33
S 12	Math 2206 Theory of Numbers	11
S 12	Math 3361 Abstract Algebra	7
S 12	Math 1186 Applied Calculus II	11
S 12	Math 1112 College Algebra	18
F 12	Math 1101 Applied Technical Math I	27
F 12	Math 1185 Applied Calculus I	22
F 12	Math 3316 Calculus III	16
F 12	Math 1112 College Algebra	25
F 12	Math 3362 (Ind. Study)	1
S 13	Math 1107 Fundamental Concepts of Math	31
S 13	Math 1186 Applied Calculus II	21
S 13	Math 3361 Abstract Algebra	11
S 13	Math 1199 Honors Senior Project	1
F 13	Math 1185 Applied Calculus I	18
F 13	Math 1190 Calculus I	33
F 13	Math 1101 Applied Technical Math I	17
F 13	Math 3362 Linear Algebra	18
S 14	Math 3315 Calculus II	30
S 14	Math 2206 Theory of Numbers	7
S 14	Math 1112 College Algebra	30

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

- Attended University-wide Faculty Development Week Fall 2009-2013, Spring 2009-2013
- Graded AP Calculus Exams-Full week-8 hours/day each June 2009,2010, 2013 (Kansas City)
- Attended Developmental Math Conference, June 4-5, 2013, Flatwoods
- Attended three day Developmental of Remedial Mathematics Presentation and workshop, FSU May 20-22, 2013
- Attended CCSS Workshop for Higher Education, April 3, 2013, Flatwoods

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

a) Wrote and Graded Regional Math Field Day Team Power Question for Area High School (March 2010)

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name:_____Melanie Harris ___________________Rank: _______Professor______________________

Check One: Full-time__X_ ___ Part-time _____ Adjunct _____ Graduate Asst. _____________________

Highest Degree Earned ____Ph. D.____________ Date Degree Received ___1991____ _________________

Conferred by _________University of Pittsburgh________________________________
Area of Specialization ______Mathematics - Topology___________

Professional registration/licensure ____ Yrs. of employment at present institution ____41_____
Years of employment in higher education __41_ Yrs. of related experience outside higher education _______
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester **Course Number & Title** **Enrollment**

Retired May 2012

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

Assessed most outcomes in Math 1107, 1115, 1190, 2212, 3315, 3316, 3361, 3375

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : ________Donald Stephen Haynes________ Rank: ________Professor_______________

Check: Full-time__X___ Part-time ______ Adjunct ______ Graduate Asst. ___________________________

Highest Degree Earned ____Ph. D._____________ Date Degree Received ___1971____ __________________

Conferred by _________Florida State University___________________________________
Area of Specialization ___________Physics _____________ ____

Professional registration/licensure ____ Yrs. of employment at present institution ____44_____
Years of employment in higher education ___44___ Yrs. of related experience outside higher education ________
Non-teaching experience ____3___

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**

Did not teach mathematics during the past year.

(b) If degree is not in area of current assignment, explain. Normally taught applied technical mathematics.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : _______Ted LaRue____________ Rank: ____Assistant Professor_________________

Check One: Full-time__X____ Part-time _____ Adjunct _____ Graduate Asst. _______

Highest Degree Earned ____MS____________ Date Degree Received ____1981____

Conferred by _________West Virginia University________________________________
Area of Specialization _____Mathematics________________

Professional registration/licensure ____ Yrs. of employment at present institution ____33_____
Years of employment in higher education __33_ Yrs. of related experience outside higher education ___
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
S 13	MATH 1112 College Algebra	30
F 13	MATH 1112 College Algebra	31
S 14	MATH 1112 College Algebra	30

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition in last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : ________Ashley M. Martin, III________________ Rank: ________Professor_______________

Check: Full-time__X____ Part-time ______ Adjunct ______ Graduate Asst. ___________________________

Highest Degree Earned ____Ph. D.______________ Date Degree Received ____1970_____ __________________

Conferred by _________Florida State University___________________________________
Area of Specialization ___________ Experimental Nuclear Physics _____________ ___________________________

Professional registration/licensure ____ Yrs. of employment at present institution ____31_____
Years of employment in higher education ___41_ Yrs. of related experience outside higher education __41__
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester **Course Number & Title**
Enrollment

Retired in 2011

(b) If degree is not in area of current assignment, explain.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

Developed and used MyMath Lab/Course Compass online Homework and Quiz Exercises.
Developed and used Mastering Physics online Homework Exercises.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : _________Martina E. Bachlechner ___________________________________ Rank: _Instructor_______________

Check One: Full-time_ ___ Part-time _____ Adjunct ___X__ Graduate Asst. ______________________________

Highest Degree Earned __PhD_____ Date Degree Received ____May 1994_______

Conferred by __Johannes Kepler University, Linz, AUSTRIA_________________
Area of Specialization __Technical Physics

Professional registration/licensure_____ Yrs. of employment at present institution 3rd year at PC&TC_
Years of employment in higher education_12__ Yrs. of related experience outside higher education ___2___
Non-teaching experience_______

To determine compatibility of credentials with assignment:

a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**

Did not teach during this time.

(b) If degree is not in area of current assignment, explain.

I earned a Master's degree to teach Math and Physics at high schools from the Johannes Kepler University in Linz, Austria. This degree is very rigorous for the Math and Physics contents and requires a small number of credit hours in general didactics and psychology, but also in topic specific didactics for Math and Physics.

(b) Identify your professional development activities during the past five years.

Developmental Education Faculty Workshop – Participation
June 5th – 7th, 2012 at Stonewall Resort in Roanoke, WV
Member of the Search Committee for a new Math Position
This entails to a review of applications, meetings, phone interviews, and site interviews with the candidates.
Campus Visitation Days on March 23, 2013 and November 10, 2012

(c) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

Invited key-note presentation at the International Symposium on Plasticity 2014 in Freeport, Bahamas, January 3 - 8, 2014; co-chair of the session Crystal & Computational Plasticity II
"Mechanical properties of silica and hybrid aerogels and xerogels: a molecular-dynamics study" by Martina E. Bachlechner, John Sandro Rivas Murillo, and Ever J. Barbero

Invited Research Stay at the University of Chile in Santiago, Chile (April 17 - 28, 2013)
Presented the talk "Molecular Dynamics Simulations of Silica and Hybrid Aerogels and Xerogels" on April 24, 2013.

Panel Discussion on Fractals in Arts and Sciences, Main campus of Fairmont State and Pierpont Community & Technical College (February 27, 2013)

The Physics of Music – Presentations: October 17 & 18, 2011; November 28, 2012; February 21, 2013

Invited key-note presentation at the International Symposium on Plasticity St. Thomas, U.S. Virgin Islands, January 3-8, 2009; "Phase Transformation due to Hypervelocity Impact on Interfaces: A Molecular-Dynamics Study" by Martina E. Bachlechner and C. Shane Poletti

(d) Indicate any other activities which have contributed to effective teaching.
I presented the following workshops:
Work It Out! Work, Energy, and Power and Their Inter-Relationship, EQT Energy Spring Series for Learning Options Inc. at the Songbird Learning Center, Fairmont, WV, March 26, 2011

Move It! Motion, Forces, and Work and Their Inter-Relationship, EQT Energy Spring Series for Learning Options Inc. at the Songbird Learning Center, Fairmont, WV, March 19, 2011

The Wonders of Light, Learning out Loud! for Learning Options Inc. at the Songbird Learning Center, Fairmont, WV, February 3, 2011

Sound of Music, Learning out Loud! for Learning Options Inc. at the Songbird Learning Center, Fairmont, WV, October 14, 2010

Computational Materials Modeling, EQT CELLO (Creating and Extending Local Learning Options) for Youth Workshop Series for Learning Options Inc. at the Songbird Learning Center, Fairmont, WV, September 12, 2010
Shoot the Hoop: Physics, Engineering and Science Challenge of the College of Science and Technology at Fairmont State University, October, 2008 and 2009.

VPython used to model gases, satellites, and solids, Project AMPLE – Extended, Fairmont State University, June/July, 2008 and 2009.

(e) List professional books/papers published during the last five years.
"Structure and Mechanical Properties of Silica Aerogels and Xerogels Modeled by Molecular Dynamics Simulation" John S. Rivas Murillo, Martina E. Bachlechner, Fritz A. Campo and Ever J. Barbero.
Journal of Non-Crystalline Solids 356 (25-27)1325-1331 (2010).

(f) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : _______Patricia Bush__________________ Rank: _______Adjunct Instructor_____________

Check One: Full-time______ Part-time _____ Adjunct _X____ Graduate Asst. ______________________

Highest Degree Earned ____Masters + 45____________ Date Degree Received ____1980's____ __________

Conferred by __________West Virginia University_________________________________
Area of Specialization ___Mathematics Education___________________ _______________________________

Professional registration/licensure __X__ Yrs. of employment at present institution ____>5_____
Years of employment in higher education __**>5**___Yrs. of related experience outside higher education____30____
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1107 Fundamental Principles of Math	12
F 12	MATH 1107 Fundamental Principles of Math	10
S 13	MATH 1107 Fundamental Principles of Math	12
S 13	MATH 1107 Fundamental Principles of Math	13
S 14	MATH 1107 Fundamental Principles of Math	8

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

Participated in WV Council of Teachers of Mathematics Meetings
WV Council of Teachers of Mathematics, past member
Participant: Blackboard Training 2012

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name: _____Robert Clonch____________________ Rank: ___________Instructor___ _____________

Check One: Full-time____ ____ Part-time _____ Adjunct __X___ Graduate Asst. _________________

Highest Degree Earned ______M.A. (M.A. + 30)____________ Date Degree Received ____1975______

Conferred by _____West Virginia University_________________ ____________________________________
Area of Specialization _____Mathematics Education_________________ ______________________________

Professional registration/licensure _____ Yrs. of employment at present institution _10______
Years of employment in higher education ___14___ Yrs. of related experience outside higher education _19_____
Non-teaching experience __21_____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1107 Fundamental Concepts	30
F 12	MATH 1107 Fundamental Concepts	30
F 12	MATH 1107 Fundamental Concepts	20
F 12	MATH 1112 College Algebra	16
S 13	MATH 1107 Fundamental Concepts	20
F 13	MATH 1107 Fundamental Concepts	28
F 13	MATH 1107 Fundamental Concepts	26
F 13	MATH 1107 Fundamental Concepts	20
F 13	MATH 1112 College Algebra	10
S 14	MATH 1107 Fundamental Concepts	20

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.
Participant: **Blackboard 9.1 Training 2012**
Participant: **AMATYC Workshop 2013**

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.

(g) List externally funded research (grants and contracts) during last five years.

Faculty Data

Name :_______Victor Wayne Daniel______________ Rank: _______Adjunct Professor____________

Check One: Full-time_ _ ___ Part-time _____ Adjunct __X___ Graduate Asst. ____________________

Highest Degree Earned ____Ph. D.____________ Date Degree Received ____1970____ _________________

Conferred by __________University of Virginia (Charlottesville)______________________________
Area of Specialization _____Mathematics____

Professional registration/licensure _____ Yrs. of employment at present institution ____5_____
Years of employment in higher education __30___ Yrs. of related experience outside higher education____10___
Non-teaching experience ___10____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
S 13	MATH 1112 College Algebra	11
F 13	MATH 1107 Fundamentals of Mathematics	18
S 14	MATH 1112 College Algebra	8

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

- Participant: West Virginia Developmental Education Summit, Stonewall Jackson Resort, June 2013.
- Participant: West Virginia Developmental Education Conference, Stonewall Jackson Resort, June 2012.
- Participant: Modularizing Curricula -- Lessons and Best Practices, Charleston, March 2012.
- Presentation: "Teaching Math and Statistics Concepts using a Generic Mathematical Package," West Virginia Academy of Science Annual Meeting, Fairmont, WV, April 2008.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years. None

(g) List externally funded research (grants and contracts) during last five years. None

Faculty Data

Name : _______Russelle (Rusty) DeVito__________ Rank: ______Adjunct Professor_____________

Check One: Full-time_____ Part-time _____ Adjunct ___X Graduate Asst. ______________________

Highest Degree Earned ____Masters____________ Date Degree Received ___2007____ ________________

Conferred by _________West Virginia University_________________________________
Area of Specialization ____Educational Leadership ____

Professional registration/licensure __X__ Yrs. of employment at present institution ____16_____
Years of employment in higher education ___16___ Yrs. of related experience outside higher education __24
Non-teaching experience ___9____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
S 12	MATH 1112 College Algebra	22
F 13	MATH 1112 College Algebra	21

(b) If degree is not in area of current assignment, explain. **Undergraduate Degree in Mathematics with 18+ hours in Higher Education Mathematics**

(c) Identify your professional development activities during the past five years.
Participant: Ipad Training 2013
Supervised Math Student Teachers 2008-2013

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.
Leadership Marion 2012

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
Drop Out Prevention Grant- 2011
Innovation Zone Grant – 2010

Faculty Data

Name : _______S. Nelson Elliott_____ ______________________ Rank: _______Adjunct __________________

Check One: Full-time_____ Part-time _____ Adjunct __X___ Graduate Asst. ______________________

Highest Degree Earned ____Masters _____________ Date Degree Received ___1998____ _______________

Conferred by __________Salem University_________________________________
Area of Specialization ___Curriculum and Instruction___________________ ____________________________

Professional registration/licensure X Yrs. of employment at present institution ________
Years of employment in higher education ___14___ Yrs. of related experience outside higher education ____30_
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**
NA		

(b) If degree is not in area of current assignment, explain.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name: _______Francisco J. Lüttecke___________ Rank: _______Part-Time Instructor_____________

Check One: Full-time_____ Part-time _____ Adjunct __X___ Graduate Asst. ______________________

Highest Degree Earned ____Ph.D.__________ Date Degree Received ___1992

Conferred by _________State University of New York at Stony Brook___________________________
Area of Specialization _____Mathematics_(Analysis and ODE's)____________ _________________________

Professional registration/licensure _X_ Yrs. of employment at present institution __11____
Years of employment in higher education ___41__ Yrs. of related experience outside higher education ___0__
Non-teaching experience ___0____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
SPRING 2012	MATH 1107	27
SUMMER 2012	MATH 1107	16
SPRING 2013	MATH 1107	28
SUMMER 2013	MATH 1107	9
SPRING 2014	MATH 1107	18

(b) If degree is not in area of current assignment, explain.
Degree is in area of current assignment.

(c) Identify your professional development activities during the past five years.
- Acquisition and maintenance of personal mathematics library, currently over 100 volumes; historical, theoretical, etc
- Acquisition of mathematics software programs, i.e., PCTeX,, MATHEMATICA.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.
None.

(e) Indicate any other activities which have contributed to effective teaching.
- Translation of mathematics textbooks (junior high and high school). This work has provided an excellent source of current educational techniques and methods, as well as classroom strategies.

(f) List professional books/papers published during the last five years.
None. (But I've been working on counterexamples in General Topology and also on metric spaces.)

(g) List externally funded research (grants and contracts) during last five years.

None.

Faculty Data

Name: __________Larry W Mason________ Rank: ________Instructor______ _______________

Check One: Full-time____ ____ Part-time ______ Adjunct __X___ Graduate Asst. ___________________

Highest Degree Earned Masters ______________ Date Degree Received ___May 1989_____________

Conferred by ____ ___________WVU______________________ __________________________________

Area of Specialization ___ ______Speech Communication ____

Professional registration/licensure _WVDE_ Yrs. of employment at present institution ___20______

Years of employment in higher education __20__ Yrs. of related experience outside higher education __37___

Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	Math 1101 Tech Math I	29
	Math 1102 Tech Math II	31
S13	Math 1101 Tech Math I	29
	Math 1102 Tech Math II	30
F13	Math 1101 Tech Math I	30
	Math 1102 Tech Math II	27
S14	Math 1101 Tech Math I	17
	Math 1107 Fund Concepts of Math	23

(b) If degree is not in area of current assignment, explain.
20 plus graduate hrs in Mathematics.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition in last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.

(g) List externally funded research (grants and contracts) during last five years.

Faculty Data

Name : ____Jeffrey S. Noel______________________ Rank: ______Adjunct Instructor__ ___________

Check One: Full-time____ ____ Part-time _____ Adjunct __X___ Graduate Asst. __________________

Highest Degree Earned ______M.S.______________ Date Degree Received ____________________

Conferred by ______________West Virginia University________________ ______________________
Area of Specialization _________Mathematics_______
Professional registration/licensure _____ Yrs. of employment at present institution __5_______
Years of employment in higher education __5____ Yrs. of related experience outside higher education ________
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
Did not teach during this period.		

(b) If degree is not in area of current assignment, explain. Degree is in area of assignment.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.

(g) List externally funded research (grants and contracts) during last five years.

Faculty Data

Name: _______Daniel Solomon___________________Rank: _______Adjunct___________________

Check One: Full-time______ Part-time _____ Adjunct __X___ Graduate Asst. ______________________

Highest Degree Earned ____MA_____________ Date Degree Received ____1979____ ____________________

Conferred by _______University of Wisconsin_________________________________
Area of Specialization _______dynamical systems_______________ _____________________________________

Professional registration/licensure ____ Yrs. of employment at present institution _________
Years of employment in higher education ___5___ Yrs. of related experience outside higher education____32____
Non-teaching experience ___32____

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**
I haven't taught any classes for FSU since the Fall semester 2011		

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities, which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
With Harry Gingold:

- On the Completeness of Quadratic Systems, *Journal of Nonlinear Analysis*, 74 (2011), 4234-4240.
- The Lorenz System has a Global Repeller at Infinity, *Journal of Nonlinear Mathematical Physics*, 18 (2011) 183-189.
- More Compactification for Differential Systems, *Advances in Pure Mathematics*, 3 (2013), 190-203.

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : _______Grant Spencer_______________________ Rank: ___Instructor_____________

Check One: Full-time_________ Part-time _____ Adjunct ___X__ Graduate Asst. _________________

Highest Degree Earned ____MA____________ Date Degree Received ___2007____ ___________________

Conferred by ____________WVU___________________________
Area of Specialization ___________Mathematics____

Professional registration/licensure __X__ Yrs. of employment at present institution___8 part-time_____
Years of employment in higher education ___8___ Yrs. of related experience outside higher education____13____
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1107 Fundamental Concepts	30
F 12	MATH 1112 College Algebra	25
F 12	MATH 1101 Applied Technical Math 1	15
S 13	MATH 1100 Intermediate Algebra	20
S 13	MATH 1112 College Algebra	25
S 13	MATH 1107 Fundamental Concepts	25
Summer 1 2013	MATH 1112 College Algebra	15
F 13	MATH 1112 College Algebra	25
F 13	MATH 1107 Fundamental Concepts	30
F 13	MATH 1101 Applied Technical Math 1	15
S 14	MATH 1100 Intermediate Algebra	20
S 14	MATH 1112 College Algebra	30
S 14	MATH 1107 Fundamental Concepts	30

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.
Supervised 63 secondary math teachers in Harrison County Schools 2009-Present
Led Common Core trainings in Math I, Math II, Math III, and Math IV 2011 – Present
Led technology integration sessions using iPads in the Math classroom 2011 – Present
Mentor new hires in Harrison County school 2013-Present
Attended WVCTM conference in 2012 and 2013
Attended WVDE sessions on school improvement

Attended AP training sessions

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition in last five years.

2010 Harrison County Teacher of the Year Runner-Up

Invited to lead sessions at the Teacher Leadership Institute by the WVDE

(e) Indicate any other activities in which have contributed to effective teaching.

I am well versed in Carnegie-problem based learning and using technology in the classroom

I work on the connection between high school and college mathematics with our teachers via the COMPASS, ACT, and SAT

(f) List professional books/papers published during the last five years.

None

(g) List externally funded research (grants and contracts) during last five years.

None

Faculty Data

Name : ____Merle__Thomas, Jr.________ Rank: ________Adjunct Instructor___ ________________

Check One: Full-time___ ___ Part-time _____ Adjunct ___X__ Graduate Asst. __________________

Highest Degree Earned _______M.A.________ Date Degree Received _____1961_________________

Conferred by __________University of Texas______________ ________________________________
Area of Specialization ___Mathematics_______________

Professional registration/licensure _____ Yrs. of employment at present institution ___15______
Years of employment in higher education ___56___ Yrs. of related experience outside higher education ___35___
Non-teaching experience ____3___

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**
F 12	Math 1102 Applied Tech Math II	6
S13	Math 1102 Applied Tech Math I	9
F13		
S14	Math 1102 Applied Tech Math I	12

(b) If degree is not in area of current assignment, explain. Degree is in area of current assignment

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.

(g) List externally funded research (grants and contracts) during last five years.

Faculty Data

Name : _______Paula Vilone_____________________ Rank: Instructor_____________________

Check One: Full-time__ _ __ Part-time _____ Adjunct ____X_ Graduate Asst. ______________________

Highest Degree Earned ____M.A.___________ Date Degree Received ___1977____ ____________________

Conferred by _________West Virginia University_________________________________
Area of Specialization _____________Mathematics Education________ _________________________________

Professional registration/licensure __X__ Yrs. of employment at present institution 13_____
Years of employment in higher education ___17___Yrs. of related experience outside higher education ____35__
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
F 12	MATH 1112 College Algebra	26
F12	MATH 1112 College Algebra	26
S13	MATH 1112 College Algebra	26
S13	MATH 1112 College Algebra	23
F13	MATH 1112 College Algebra	25
F13	MATH 1112 College Algebra	24

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.

- Blackboard Training
- MyLabsPlus Training

List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.

(d) Indicate any other activities which have contributed to effective teaching.

(e) List professional books/papers published during the last five years.
None

(f) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : ________Brittany Vincent_________________________ Rank: ________Adjunct_________________

Check One: Full-time_______ Part-time ______ Adjunct __X____ Graduate Asst. ____________________

Highest Degree Earned _____M.S. Math_____________ Date Degree Received ____2011____________________

Conferred by __________West Virginia University__________________________________
Area of Specialization _____Pure Math____

Professional registration/licensure __X__ Yrs. of employment at present institution _____1______
Years of employment in higher education ___3____ Yrs. of related experience outside higher education____1____
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester		Course Number & Title	Enrollment
S12	1186	Applied Calculus II- Online	9
F 12	1107	Fundamental Concepts of Mathematics	12

(b) If degree is not in area of current assignment, explain. **Degree is in area of current assignment**

(c) Identify your professional development activities during the past five years.
Common Core Training 2012-2013

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition In last five years.
None

(e) Indicate any other activities which have contributed to effective teaching.
Research Projects: Students' Understanding of Tangent Line (paper accepted, but not yet published)
Students' Understanding of Area Between Two Curves (paper not submitted)

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Faculty Data

Name : ________Kevin Wright________________ Rank: ________Adjunct Instructor________________

Check: Full-time______ Part-time _____ Adjunct __X___ Graduate Asst. ________________________

Highest Degree Earned ____Masters_____________ Date Degree Received ____1980____ _________________

Conferred by __________West Virginia University___________________________________
Area of Specialization ____________Mathematics Education____

Professional registration/licensure __X__ Yrs. of employment at present institution ____18_____
Years of employment in higher education ___18___Yrs. of related experience outside higher education ____36__
Non-teaching experience _______

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	**Course Number & Title**	**Enrollment**
No longer teaching at FSU		

(b) If degree is not in area of current assignment, explain.

(c) Identify your professional development activities during the past five years.

(d) List awards/honors (including invitations to speak in your area of expertise) or special recognition in last five years.

(e) Indicate any other activities which have contributed to effective teaching.

(f) List professional books/papers published during the last five years.
None

(g) List externally funded research (grants and contracts) during last five years.
None

Tab 5

Appendix C

Course Handbooks For Math 1101, 1102, 1107 &1112

FAIRMONT STATE UNIVERSITY

MATH 1101 & 1102 HANDBOOK

FALL 2012

Math Department Contact

Susan Goodwin

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New for This Year (2012-13)

At the request of instructors, we added MyMathLab to the Washington book package along with a math study skills book last year**.** All instructors should have desk copies already. If you do not want the book or already have a copy, please let me know (or send it back to me). (I would also take any student study skills books if they wish to get rid of them.) These resources will be available to both Math 1101 and 1102 students this fall. Students who were enrolled in Math 1101 last spring should be able to roll their MyMathLab membership to the new course. If students have difficulty they can contact the MyMathLab help at http://www.mymathlab.com/student-support. Note that the book itself is not changing. However there is a new edition coming out soon. I am hoping we can keep the old book for the spring term also but I am not sure that will be possible. Those who teach 1102 in the spring will, of course, be using the old book in the spring no matter what. When I know about the new book, I will let you know.

I have set up my course in Course compass so you can copy to yours. It includes the homework assignments by section. These are what I would assign if I were teaching the course. Feel free to add homework in your section once you have copied my section into yours. Note that in Chapters 4 and 8 where we are giving only minimal attention to sec, csc, and cot, many of the homework problems regenerate picking from all trig functions. You might tell the students to regenerate the problem if they get one of the reciprocal functions. This is also true in Chapter 10 section 4 where we are limiting to tangent. The problem numbers from the book are evident in MyMathLab so you can see the type of problem assigned but the numbers (and sometimes the function) will be different for each student.

If you do not have an account with MyMathLab, go to the following to register:

http://www.coursecompass.com/

When you get logged in, click on create/copy course; then select the radio button for "copy a course"; then select "copy another instructor's course". Use goodwin92369 for the course ID for Math1101 Master and goodwin49606 for the Math 1102 Master. If you have questions or trouble let me know.

There is a new version of BlackBoard. You can see your class by going to https://ilearn-fsu.wvnet.edu/. I have already created a syllabus for you. Go to Course Content and click on Syllabus. You need to possibly edit your personal info in the syllabus along with your grading info. This can be done by clicking edit on the gray circle next to the section you wish to edit. When you have completed your section hit submit and the changes will be saved. **Your grades for the course still need to be entered in BlackBoard as always.**

Assessment: We will do **only** the assessment for **outcome 1** in each course. The results should be sent to me as soon as you have given the assessment (at least by the end of Sept.).

Philosophy of Tech Math I & II – Math 1101 & Math 1102

Tech Math I and II were created jointly by the math and tech departments to satisfy the pre-calc mathematics requirements for technology students. Although the material in these courses resembles that in College Algebra and College Trig, it contains more applications, particularly to those areas in Engineering Technology, and the order of topics is VERY different. Tech Math I contains most (but not all) of the trig. This is necessitated by a Statics requirement for second semester freshmen for many of the tech majors. Even the order of chapters is sometimes important for a student's ability to work problems in a companion class.

The order of topics covered is also different than traditional Algebra and Trig courses. Most (but not all) trig is covered in Math 1101 to prepare those students required to take courses such as Statics second semester of their freshman year. Thus, Math 1101 and 1102 may not be intermixed with College Algebra and Trig. If a student starts in Math 1112 (College Algebra) he must take Math 1115 (Trig) or if a student starts in Math 1101 he must take Math 1102. And, because of the intermingling of topics, the only way into Math 1102 is a "C" or better in Math 1101.

Although algebraic manipulation skills are important (and subsequent instructors complain about student competencies in this area), students must be able to apply what they should be learning. i.e. A course without word problems is not much of a course at all. Comments from the Tech faculty indicate that any algebraic manipulation that the students are required to do is a plus - they are weak in this area. They also need students with strong trig background. (Essentially the whole of 1101 and 1102)

The textbook, Basic Technical Mathematics, 10^{th} edition by Washington was chosen with the above philosophy in mind. This text will be used for Math 1101, 1102, Tech 2290 and Tech 3300. It is not used for the Applied Calculus, Math 1185 and 1186 or for the regular calculus sequence starting with Math 1190.

Contrary to what anyone says, if a student is calculus-ready (deemed that way by ACT, SAT, or compass scores), they are NOT required to take Math 1101 or Math 1102. However, we cannot keep a student out of the course if that is his (her) choice. A student must have a math course to satisfy liberal studies. Refer any students with questions about this to Susan Goodwin (367-4307). In addition, if a student has AP credit for Calc (actually made a 3 or better on the AP exam), they do not need to be taking this course and should already have calculus credit on their transcript. Likewise if a student has credit for WvEb algebra or trig from high school, they should not be in these classes. Please ask on the first day of class about AP or WvEB course and send them to me if they have a 3 or better on the AP test or credit for WvEB algebra and/or trig.

Learning Outcomes for Math 1101 – Tech Math I

Following successful completion of this course the student will be able to:

1. Demonstrate appropriate symbolic manipulation skills to simplify algebraic expressions
2. Synthesize math knowledge to solve and graph functions and relations
3. Solve problems using simultaneous equations
4. Use problem solving methods to investigate, model and solve trig functions
5. Solve problems using vectors
6. Use the law of sines and cosines to solve problems
7. Use the language of mathematics to describe trig relationships

Learning Outcomes for Math 1102 – Tech Math II

Following successful completion of this course the student will be able to:

1. Identify, solve, and apply second-degree equations.
2. Use the language of mathematics to describe and apply trig relationships and patterns
3. Demonstrate appropriate symbolic manipulation skills in applying powers and logarithms
4. Solve and graph inequalities
5. Perform basic operations with complex numbers

Tables of Course Outcomes, Assessment Measures, & Performance Standards

Math 1101		
Outcome	Assessment Measurement	Performance Standard
1. Demonstrate appropriate symbolic manipulation skills to simplify algebraic expressions	1. Exam question assessed using the attached Arizona Math Rubric **Simplify: 3 – 2 [4 – 2 (3 – 7) + 81 ÷ 32 x 3]**	The average of all students will be 2 or better on the Arizona Math Rubric
2. Synthesize math knowledge to solve and graph functions and relations	2. Exam question assessed using the attached Arizona Math Rubric **Decide if the graph is a function and justify your decision. Analyze the domain and range. Find the solution set. Explain how your arrived at your answers.**	The average of all students will be 2 or better on the Arizona Math Rubric
3. Solve problems using simultaneous equations	3. Exam question assessed using the attached Arizona Math Rubric **A boat goes 40 km downstream in 2 hours and returns in 4 hours. Find the speed of the boat in still water and the speed of the current.**	The average of all students will be 2 or better on the Arizona Math Rubric
4. Use problem solving methods to investigate, model and solve trig functions	4. Exam question assessed using the attached Arizona Math Rubric **An architect needs to build a wheelchair ramp with a rise of 1.6 m in an existing building. Safety standards indicate that the ramp may have an angle of inclination of, at most, 8 degrees. The length of the hallway where the ramp is to be constructed is 10 m. Decide if it is possible to fit the ramp in this hallway?**	The average of all students will be 2 or better on the Arizona Math Rubric
5. Solve problems using vectors	5. Exam question assessed using the attached Arizona Math Rubric **A worker is ready to fly out to rescue flood victims, but on her way to the hanger, meets a returning worker. The incoming worker tells her that there is a person 33 km SE of the hanger. Before leaving, she meets another incoming pilot and *she* tells her of a person stranded 45 km due S of the hanger. If the pilot is to rescue both people in their respective order before returning home, what direction and distance will she need to fly to get from the first person to the second person? If her average velocity is 100 mi/hr, how long will it take to get from the first to the second person?**	The average of all students will be 2 or better on the Arizona Math Rubric
6. Use the law of sines and cosines to solve problems	Exam question assessed using the attached Arizona Math Rubric **A triangle ABC has a = 8, b = 9, and c = 7. Find the measure of all angles?**	The average of all students will be 2 or better on the Arizona Math Rubric
7. Use the language of mathematics to describe trig relationships	Exam question assessed using the attached Arizona Math Rubric **Using appropriate terminology, explain the relationship between sine, cosine, and tangent.**	The average of all students will be 2 or better on the Arizona Math Rubric
Math 1102		
Outcome	Assessment Measurement	Performance Standard
1. Identify, solve, and apply second-degree equations	*Exam question assessed using the attached Arizona Math Rubric* ***A garden measuring 12 meters by 16 meters needs to have a pedestrian pathway installed all around it, increasing the total area to 285 square meters. Find the width of the pathway. If the depth of the walkway is 3 inches, find the cubic feet of concrete needed to pour the walk.***	*The average of all students will be 2 or better on the Arizona Math Rubric*

2. Use the language of mathematics to describe and apply trig relationships and patterns	Exam question assessed using the attached Arizona Math Rubric **Find the equation of the graph. Describe your process using terms such as amplitude, period, etc. (Students would be given the graph of y = -2 sin 3x or something similar.)**	The average of all students will be 2 or better on the Arizona Math Rubric
3. Demonstrate appropriate symbolic manipulation skills in applying powers and logarithms	Exam question assessed using the attached Arizona Math Rubric **Solve the following logarithmic equation for x** **Log4 x + log4 (x + 6) = 2**	The average of all students will be 2 or better on the Arizona Math Rubric
4. Solve and graph inequalities	Exam question assessed using the attached Arizona Math Rubric **Solve graphically the system of simultaneous inequalities:** **$y < x + 2$** **$y > x^2 - 3$**	The average of all students will be 2 or better on the Arizona Math Rubric
5. Perform basic operations with complex numbers	Exam question assessed using the attached Arizona Math Rubric **Compute and put in standard form. Show all work.** **$\frac{-2 + 3j}{3 + j}$**	The average of all students will be 2 or better on the Arizona Math Rubric

Arizona Department of Education Rubric
(Direct Measure Evaluation Tool)

Source: Arizona Department of Education

Holistic Scale

4 -- A 4 response represents an effective solution. It shows complete understanding of the problem, thoroughly addresses all points relevant to the solution, shows logical reasoning and valid conclusions, communicates effectively and clearly through writing and/or diagrams, and includes adequate and correct computations and/or setup. It may contain insignificant errors that do not interfere with the completeness or reasonableness of the student's response.

3 -- A 3 response contains minor flaws. Although it shows an understanding of the problem, communicates adequately through writing and/or diagrams, and generally reaches reasonable conclusions, it shows minor flaws in reasoning and/or computation or neglects to address some aspect of the problem.

2 -- A 2 response shows gaps in understanding and/or execution. It shows one or some combination of the following flaws: an incomplete understanding of the problem, failure to address some aspects of the problem, faulty reasoning, weak conclusions, unclear communication in writing and/or diagrams, or a poor understanding of relevant mathematical procedures or concepts.

1 -- A 1 response shows some effort beyond restating the problem or copying given data. It shows some combination of the following flaws: little understanding of the problem, failure to address most aspects of the problem, major flaws in reasoning that lead to invalid conclusions, or a lack of understanding of relevant mathematical procedures or concepts.

0 -- Response shows no mathematical understanding of the problem or the student has failed to respond to the item.

Cover Sheet for Submission of Data

Math ______
Assessment Results

Outcome:
#1 #2 #3 #4 #5 #6 #7

Semester ______________________

Section# ______________________

Instructor ______________________

Date of Assessment ______________________

Number of Student Participants ______________________

Mean Arizona Rubric Score ______________________

Math 1101 Course Outline

Following the completion of Math 1101, with the use of a graphing calculator the student should be able to

I. Demonstrate appropriate symbolic manipulation skills to simplify algebraic expressions and solve equations
1. manipulate signed numbers
2. solve order-of-operation problems
3. use basic graphing calculator functions
4. solve problems involving exponents
5. apply accuracy and precision laws
6. perform basic operations with polynomials (no long division)
7. solve linear equations
8. manipulate literal equations
9. solve applied linear equations

II. Synthesize math knowledge to solve and graph functions and relations
10. use the TI 85 linear graphing capabilities
11. work with a Cartesian plane
12. find slope
13. graph linear functions
14. apply function definition

III. Solve problems using simultaneous equations
15. solve simultaneous equations (2 only)
16. solve 2x2 determinants
17. use Cramer's rule
18. apply simultaneous equations

IV. Use the language of mathematics to describe trig relationships
19. define trig functions
20. use a calculator's trig functions
21. find inverse trig functions (sin, cos, tan only)
22. choose proper quadrants for inverse trig functions

V. Use problem solving methods to investigate, model and solve trig functions
23. solve right triangle problems
24. adapt trig functions to all quadrants
25. find trig functions of arbitrary angles
26. use radian measure

VI. Solve problems using vectors
27. find a resultant vector graphically
28. reduce a vector to x and y components
29. find a resultant vector algebraically
30. apply vectors

VII. Use the law of sines and cosines to solve problems
31. state law of sines and the law of cosines
32. solve law of sin problems
33. solve law of cos problems
34. solve applied law of sin and cos problems
35. distinguish between oblique triangle solutions

VIII. Demonstrate appropriate symbolic manipulation skills to simplify algebraic expressions and solve equations
36. perform long binomial multiplication
37. use FOIL to compute binomial products
38. factor by grouping
39. factor binomials and trinomials
40. multiply and divide polynomial fractions

41. add and subtract polynomial fractions
42. simplify complex fractions
43. clear denominators
44. solve fractional equations

Math 1102 Course Outline

Following the completion of Math 1102, with the use of a graphing calculator the student should be able to:

I. Identify, solve, and apply second-degree equations.

1.State the quadratic formula
2. Solve quadratic equations
3. Apply the quadratic formula
4. Identify conic sections
5. Graph simultaneous equations
6. Solve equations in quadratic form
7. Use a variety of problem solving methods to investigate, model, and solve real-world problems

II. Use the language of mathematics to describe and apply trig relationships and patterns

1. Graph trig functions
2. Identify trig graphs including amplitude, period, and phase shift
3. State basic trig identities
4. Synthesize mathematical knowledge for a reasoned, logical, and legitimate conclusion to prove trig identities
5. Find arc and Arc function values
6. Solve trig equations
7. Use trig calculator functions

III. Demonstrate appropriate symbolic manipulation skills in applying powers and logarithms

1. Appy integral exponent laws
2. Apply fractional exponent laws
3. Perform basic operations with radicals
4. Solve equations involving radicals
5. Define logarithms
6. Simplify logarithms
7. Find antilogs
8. Change logarithmic base
9. Solve logarithmic equations
10. Use calculator log functions

IV. Solve and graph inequalities

1. Simplify inequalities
2. Solve quadratic inequalities
3. Solve absolute value inequalities
4. Graph inequalities
5. Use interval notation

V. Perform basic operations with complex numbers

1. Define complex numbers
2. Graph complex numbers
3. Perform complex number operations
4. Change complex numbers to polar form
5. Change complex numbers to exponential form
6. Multiply and divide using polar and exponential form

Textbook Information

BASIC TECH.MATH.W/CALCULUS

WASHINGTON

Edition:9TH 09
Publisher:PEARSON
ISBN: 9780132763974

Sections Covered

Math 1101

Chapter 1	sections 1 – 12	Section 1-6: minimal attention to simplifying radicals such as the square root of 12 = 2 the square root of 3; and to rationalizing denominators Section 1-9: no long division (i.e. no problems 25 and up on page 34)
Chapter 3	sections 1 - 5	
Chapter 5	sections 1 - 5	
Chapter 4	sections 1 – 5	minimal attention to sec, csc, & cot
Chapter 8	sections 1 – 3	minimal attention to sec, csc, & cot (section 4 if time allows)
Chapter 9	sections 1 – 6	Section 9-5 minimal attention to ambiguous case
Chapter 6	sections 1 – 8	

Math 1102

Chapter 7	sections 1 – 4	
Chapter 18	sections 1 - 2	
Chapter 10	sections 1, 2, and 4 (tan only)	
Chapter 20	sections 1, 5, and 6 (omit anything that necessitates knowing sum & difference, double and half angle formulae)	
Chapter 11	sections 1 – 5	omit division of radicals
Chapter 13	sections 1 – 6	section 13-5 omit changing log base b of x to (log base a of x)/(log base a of b)
Chapter 12	sections 1 – 4	
Chapter 17	sections 1 - 5	

Calculator Information

TI 83, TI 84, TI 85 and TI 86 are the recommended calculators. (Although TI does not still make 85s and 86s, students can still find them and they are excellent calculators to use for this class). **TI-89s are not appropriate at this level.** The department has a set of 86s, a set of 84s, and a set of TI 30XSs (non-graphing) if you wish to use them for testing. These must be reserved ahead of time to make sure they are available. (Mention to students that on the FE or CSP exam, they are only permitted a TI 30 or its ilk.)

Technology would like students to be proficient with graphing calculators but not at the expense of algebraic manipulation skills. Thus instructors must find a happy medium. For instance, I frequently show students how to perform complex number operations after they have taken the test. Some bitterness has occasionally ensued but teacher knows best.

Syllabus template for TTh course outline: Add your section coverage in the second column (borders of the table are hidden) below; copy and paste into your syllabus. You need to change the dates if you are doing a MW or a MWF section.

August 21
August 23
August 28
August 30
September 4
September 6
September 11
September 13
September 18
September 20
September 25
September 27
October 2
October 4
October 9
October 11
October 16
October 18
October 23
October 25
October 30
November 1
November 6
November 8
November 13
November 15
November 27
November 29
December 4
December 6
December 15
Slight changes in dates & outline may occur.

Sample Blackboard Syllabus

Section Information: MATH-1102-01 Spring 2008
Course Name : MATH-1102
Course Description : Applied Tech Mathematics II
Section Instructor: Susan Goodwin
E-mail : Susan.Goodwin@fairmontstate.edu
Contact Information
Office 421 ET
Hours
MW: 9-10
TTh: 11-12
F: arranged.
Phone: 367 4307
Course Information
CRN: 2460
Course Description: This course is a continuation of Math 1101. Topics include solving radical equations and polynomial equations, complex numbers, exponential and logarithmic functions, inequalities and trigonometry. PR: MATH 1101 with a "C" or better.
Textbook and Calculator Requirement
BASIC TECH.MATH.W/CALC. Edition:9TH
Author: WASHINGTON
Publisher:PEARSON
ISBN: 9780132763974
(Will include a MyMathLab code and Math Study Skills book for Math 1101 in the fall and both 1101 and 1102 in the spring.)
A TI-85 or TI-86 Graphing Calculator is strongly recommended. Other scientific calculators are acceptable but not taught in the class.
All tests will be taken using my TI-84, TI-85 or TI-86 calculators.
Attendance
My Policy:Although I do not lower your grade for non-attendance, you are not able to make up missed in-class work. I do take attendance and I am not sympathetic to the academic plight of students who do not attend.
University Policy: See Below
Course Evaluation
Tests
Five chapter tests and a comprehensive final will be given during the semester. All make-up tests will be given on the last day of class.
Homework
One problem from each homework assignment will be graded. One bonus point will be given if the problem is correct with all work shown.
In-class problem
One 5-point problem will be given at the end of each class (excluding test days). The sum of the best 20 problems will be a test grade.
Grades
Midterms - average of tests at that time.
FINAL GRADE - (test 1 + test 2 + test 3 + test 4 + test 5 + final + in-class problem test + homework points)/7
A: 90 - 100
B: 80 - 89
C: 70 - 79
D: 60 - 69
F: 0 - 59
****You must have a C or better in 1102 to take Engineering Analysis.**
Academic Integrity
My Policy: Cheating is serious business: According to state regulations, students can be expelled for cheating.
The first time a student cheats, he or she will receive a zero for that test or assignment, along with a warning.

The second time, the student will receive an "F" for the course, and I will send a memo to the student's advisor stating the reason.
University Policy: see below

University Policies

Institutional Syllabus Statements

Program Goal

Demonstrate basic manipulative skills in algebra, geometry, trigonometry and beginning calculus.

Learning Outcomes and Objectives

Following the completion of Math 1102, with the use of a graphing calculator the student should be able to:

I. Identify, solve, and apply non-linear functions

1. Identify, solve, and apply second-degree equations.
    - a. State the quadratic formula
    - b. Solve quadratic equations
    - c. Apply the quadratic formula
    - d. Identify conic sections
    - e. Graph simultaneous equations
    - f. Solve equations in quadratic form
    - g. Use a variety of problem solving methods to investigate, model, and solve real-world problems
2. Use the language of mathematics to describe and apply trig relationships and patterns
    - a. Graph trig functions
    - b. Identify trig graphs including amplitude, period, and phase shift
    - c. State basic trig identities
    - d. Synthesize mathematical knowledge for a reasoned, logical, and legitimate conclusion to prove trig identities
    - e. Find arc and Arc function values
    - f. Solve trig equations
    - g. Use trig calculator functions
3. Demonstrate appropriate symbolic manipulation skills in applying powers and logarithms
    - a. Apply integral exponent laws
    - b. Apply fractional exponent laws
    - c. Perform basic operations with radicals
    - d. Solve equations involving radicals
    - e. Define logarithms
    - f. Simplify logarithms
    - g. Find antilogs
    - h. Change logarithmic base
    - i. Solve logarithmic equations
    - j. Use calculator log functions

II. Solve and apply real number inequalities

1. Solve and graph inequalities
    - a. Simplify inequalities
    - b. Solve quadratic inequalities
    - c. Solve absolute value inequalities
    - d. Graph inequalities
    - e. Use interval notation

III. Solve problems within the Complex number system

1. Perform basic operations with complex numbers

    a. Define complex numbers
    b. Graph complex numbers
    c. Perform complex number operations
    d. Change complex numbers to polar form
    e. Change complex numbers to exponential form
    f. Multiply and divide using polar and exponential form

Course Schedule
Jan 15 7-1, 7-2
Jan 17 7-3, 7-4
Jan 22 18-1
Jan 24 18-2
Jan 29 Test
10-1, 10-2
Jan 31 10-4
Feb 5 20-1
Feb 7 20-1
Feb 12 20-5
Feb 14 20-6
Feb 19 Test
11-1
Feb 21 11-2
Feb 26 11-3, 11-4
Feb 28 11-5
Mar 4 14-4
Mar 6 Test
13-1, 13-2
Mar 18 13-3, 13-4
Mar 20 13-5, 13-6
Mar 25 17-1, 17-2, Interval notation
Mar 27 17-3
Apr 1 17-4, 17-5
Apr 3 Test
12-1
Apr 8 12-2, 12-3
Apr 10 12-4
Apr 15 12-5
Apr 17 12-6, 14-1
Apr 22 14-2
Apr 24 Test
14-3
Apr 29 14-3; Review
May 1 Make-up Tests
May 8 Final (8-10 AM)
Slight changes in dates and outline may occur.

Instructor Checklist – Math 1101 & 1102

- Blackboard section contains a syllabus with correct contact information, absence policy, and grading policy.
- All grades must be entered in Blackboard.
- Letter grade of D and F reported at the 4 week interval in FELIX.
- Midterm and Final grades entered in FELIX by the administrative deadline. You must enter a "last date of attendance" for students who withdraw or have an F.
- All students must complete the requested direct assessment measure. Instructors grade the assessments with the Arizona Math Rubric found in the handbook. All student papers are returned with the cover sheet containing average rubric score and number of students to Susan Goodwin no later than the due date of final grades. Number of points toward the student grade is at the discretion of the instructor.
- Return data about grades no later than two weeks after the close of the semester. This information will be used to calculate success rate to compare with data from institutional research.
- Students must have a grade of "C" or better in Math 1101 to take Math 1102. They must have a grade of "B" or better to take Applied Calculus, Math 1185.
- Please add Dr. Gilberti (agilberti) and me (sgoodwin) as teaching assistants in blackboard.

FSU Math Pre-requisites for 1000 level courses

Fairmont State University:

Math 1101 –	ACT >= 19 SAT <= 460 COMPASS Algebra >= 36 Pierpont: Math 0095 credit
Math 1102 --	Math 1101 with a C or higher
Math 1107 --	ACT >= 19 SAT >= 460 COMPASS Algebra >= 36 Pierpont: Math 0095 credit
Math 1112 --	ACT >= 21 SAT >= 500 COMPASS Algebra >= 49 Pierpont: Math 1100 credit FSU: Math 1199 credit FSU: Math 2251 credit
Math 1115 --	ACT >= 23 SAT >= 540 COMPASS Algebra >= 63 FSU: Math 1112 with a C or higher
Math 1185 --	ACT >= 24 SAT >= 560 COMPASS Algebra >= 67 FSU: Math 1115 FSU: Math 1102 with an A or B
Math 1190 --	ACT >= 25 SAT >= 570 COMPASS Algebra >= 73 FSU: Math 1115, 1170, 1186

NOTE: ACT and SAT scores are valid for 5 years. COMPASS scores are valid for 2 years only! The date of the student test is found in FELIX under Faculty Advisors Menu>Student Test Scores.

Updated 8/16/2012

Fairmont State University

Math 1107 Handbook
Fall 2012-Spring 2013

June 19, 2012

Math Dept. Contacts: Dennine LaRue (304-367-4621) alarue@fairmontstate.edu
Randy Baker (304-367-4626) rbaker@fairmontstate.edu

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Math 1107 Philosophy

Math 1107 (Fundamental Concepts of Mathematics) is designed for students who need to earn credit for quantitative literacy in the general studies program, but do not need college algebra or above for their major. Hence, this class consists of applications of basic mathematics and introductory algebra, rather than the instruction of algebra skills.

Students can enroll in Math 1107 if they have earned at least a 19 Math ACT, at least a 460 Math SAT, at least a 36 Math Compass, or have credit for Math 0095(Elementary Algebra) or have credit for Math Modules 0081-0086. Developmental Math is starting a new standards based module program in Fall 2012. In Spring 2013, faculty will have to check for the math module pre-requisite.

Math 1107 will not serve as a pre-requisite for any other FSU math class. This class will not serve as a pre-requisite for college algebra, if a student needs it for their major.

The four general studies outcomes serve as the course outcomes for Math 1107.

1. Use problem solving methods to investigate, model, and solve real-world problems at an appropriate mathematical level.

2. Demonstrate appropriate symbolic manipulation skills.

3. Use the language of mathematics to describe relationships and patterns using precise terminology.

4. Synthesize mathematical knowledge for a reasoned, logical, and legitimate conclusion.

The course outline covers the topics needed to cover the general studies outcomes. The topics are problem solving, personal finance, set theory, probability, statistics, and some logic applications (not truth tables.) This is **NOT** an Algebra class, but instruction in applications of Algebra and introductions to other math topics. Note that the chapters on Algebra, Measurement, and Geometry are NOT included in the course outline.

Since Fall 2010, a paperback book titled **Start Here: Getting Your Financial Life on Track** published by the American Institute for Economic Research was added to the course reading material. Faculty will use this book for reading assignments and weekly class discussion about personal finance throughout the semester. It is a good way to encourage discussions between traditional and non-traditional students. The discussions can be very enlightening for all participants. Enclosed is a list of possible questions for review of the book. This was donated by an adjunct.

For most students this is the last math class they may take. Students should be exposed to applications of the algebra they learned in high school and realize that math permeates every part of their life. Creative pedagogy, group work, and use of math manipulatives are encouraged by the math department in order to improve student attitudes toward mathematics. These students may someday be parents and their attitudes will be passed to future generations. This is the last chance which the education system has to positively affect the mathematical attitudes of future generations through our current college students.

06/19/2012

Math 1107 – Fundamental Concepts of Mathematics -- 3 hours
Course Outcomes and Objectives (Effective Fall 2012) ***Revised 06/19/2012***

.**Course Catalog Description:**

This introductory survey course is specifically designed to fulfill the General Studies requirements in mathematics. It is designed to strengthen computational skills while focusing on real world problems. Topics may include critical thinking skills, sequences, set theory, logic, probability, statistics, consumer mathematics, and the metric system. This course does not serve as a pre-requisite for any higher level mathematics course. PR: Math ACT ≥19 OR Math SAT ≥460 OR Math COMPASS score ≥ 36 OR at least MATH 0095 -- Elementary Algebra.

Textbook: **<u>Thinking Mathematically</u> by Blitzer, Fifth Edition Prentice Hall, 2011.**
ISBN 978-0-321-64585-2
Note: All sections must use this text.

<u>Chapters covered:</u>
Sections 1.1 and 5.7 **(as application of 1.1)**
Section 1.3 **(Use these types of problems throughout semester to generate interest)**
Chapter 2 and Section 5.5 **(as application of chapter 2)**
Chapter 8 **(skip 8.4 & in 8.5 focus on mortgages, credit cards discussed in Financial Life paperback.)**
Chapter 11 **(may skip 11.2 and 11.3 ,if there is not enough time, level of chapter coverage dependent on student ability)**
Chapter 12 **(may skip 12.6 if there is not enough time)**
KenKen Puzzles

Weave concepts of logic into all discussions of problem solving, set theory, and probability. In particular the use of the following words: and, or, not, and if/then. Do not teach truth tables as a separate topic!

<u>Do NOT cover Chapters 5, 6 , 7, and 10. This is pre-requisite material.</u>
<u>This is not an Algebra or Geometry class.</u>

Reading assignments followed by class discussion using the paperback :
Start Here: Getting Your Financial Life on Track by Norton. Published by AIER.
ISBN 978-0-913-61067-1

<u>General Studies Outcomes:</u>
QUANTITATIVE LITERACY: Students should be able to use quantitative skills and the language of mathematics to solve problems and communicate about technical matters in their academic work, in society, and in the workplace. Students should be able to:

1. Use a variety of problem solving methods to investigate, model, and solve real-world problems at an appropriate mathematical level.
2. Demonstrate appropriate symbolic manipulation skills.
3. Use the language of mathematics to describe relationships and patterns using precise terminology.
4. Synthesize mathematical knowledge for a reasoned, logical, and legitimate conclusion.

Creative pedagogy, group work, and use of math manipulatives are encouraged by the math department in order to improve student attitudes toward mathematics.

Math 1107 Course Objectives for Math 1107 (General Studies outcomes are underlined) Revised 06/19/2012

Upon completion of this course, the student will be able to:

I. Use the language of mathematics to write and communicate using precise terminology during the entire the semester.

II. Use a variety of problem solving methods and tools to investigate, model, and solve real-world problems at an appropriate mathematical level.
   - A. Differentiate between inductive and deductive reasoning.
   - B. Use the language of math to describe relationships and patterns.
   - C. Use Polya's problem-solving process.
   - D. Determine reasonableness of solution by estimation.
   - E. Use deductive reasoning to reach a reasoned, logical, and legitimate conclusion.

III. Make informed decisions on questions about personal finances using appropriate symbolic manipulation skills.
   - A. Solve applied problems involving sales tax and discounts.
   - B. Find percent increase and decrease.
   - C. Investigate some of the ways in which percent is abused.
   - D. Compute simple interest and apply to problems involving savings and loans.
   - E. Compute compound interest and determine annual percentage yield.
   - F. Calculate principal to invest in order to obtain a specific future value.
   - G. Solve problems concerning mortgages.

IV. Apply set theory to problem solving and demonstrate the exact meaning of connectives.
   - A. Define terms including element, null set, equal sets, equivalent sets and disjoint sets.
   - B. Find proper and improper subsets.
   - C. Find unions, intersections and complements.
   - D. Show set relationships with Venn diagrams.
   - E. Find cardinality of a set.
   - F. Determine whether a set is finite or infinite.
   - G. Solve survey problems using set theory
   - I. Relate searching for information on the internet using Boolean operators to Venn diagrams. (http://catalog.loc/gov/help/boolean.htm)

V. For an event, find probability and odds in favor and against.
   - A. Construct a sample space.
   - B. Construct a tree diagram.
   - C. Use the fundamental counting principle.
   - D. Use factorial notation to count the number of permutations and combinations.
   - E. Compute simple and compound probability.
   - F. Compute odds.
   - G. Determine mathematical expectation.

VI. Use statistics for decision-making.

A. Identify sampling techniques.
B. Determine correct uses and misuses of statistical data.
C. Construct a frequency distribution.
D. Interpret and construct line, bar, and circle graphs using technology
E. Find measures of central tendency (mean, median, mode and midrange).
F. Calculate measures of dispersion (range and standard deviation).
G. Solve real world problems using normal distribution

VII. Apply deductive reasoning using logic to solve problems and demonstrate exact meaning of connectives.

A. Draw Venn diagrams for quantified statements- Euler diagrams.
B. Apply truth values of basic connectives (conjunction, disjunction, negation, conditional) to analyze real world situations.
C. Use basic logic connectives for problem solving in set theory and probability.

Problem solving topics:
Sample class activities enclosed. Use during class. FSU full time faculty shared activities for use in all sections.
Find the nth term for arithmetic and geometric sequences
Gauss Technique to find the sum of the terms of an arithmetic sequence
Investigate difference between linear (arithmetic) and exponential (geometric) growth
Pascal's Triangle
KenKen Puzzles
Boolean searches on internet
Use Excel spreadsheets. Students try to hardcode all data. Require use of formulas!

Optional topics after the course outline has been covered: Chapters 9, 14,and 15. It is very unlikely that you will need this material. Primary goal is ensure that students are proficient at required chapters.

Math 1107 – Fundamental Concepts of Mathematics
Math Department Course Outline – Suggested Order

I. Problem solving techniques.
  A. Differentiate between inductive and deductive reasoning.
    1. The role of counterexamples.
    2. AProof@ by example is not reliable.
    3. Use number tricks to illustrate inductive reasoning. Prove using algebra.
    4. Identify different types of number patterns using inductive reasoning
  B. Use Polya=s problem-solving process.
    1. Understand the problem.
    2. Devise a plan.
    3. Carry out the plan and solve the problem.
    4. Look back and check the answer.
      a. Determine reasonableness of solution by estimation.
      b. If necessary, repeat the process. Identify patterns.
  C. Apply a variety of problem solving methods to investigate, model, and solve application problems during entire semester.
    1. Solve for terms in arithmetic and geometric sequences
    2. Gauss technique to find sum of terms of an arithmetic sequence
    3. Compare and contrast linear (arithmetic) versus expntl. (geometric) growth
    4. Pascal's Triangle
    5. Excel Spreadsheets to calculate solutions

II. Making informed decisions on questions about personal finances.
  A. Is a sale a sale?
    1. Compute percent increase and decrease.
    2. Calculate sales tax and income tax.
    3. Compute income tax using tax table in Form 1040 ES – not textbook
    4. Abuses in use of percentages
  B. Saving and loans.
    1. Compute simple interest on savings and loans.
    2. Compute compound interest and determine annual percentage yield.
    3. Calculate future and present value.
    4. Compare simple and compound interest with various data
    4. Use Rule of 72 to determine when an investment amount will double
  C. Installment buying.
    1. Credit card payments.
    2. How early repayment affects the total cost of a purchase.
    3. How to use a credit card effectively
  D. Buying a house.
    1. Calculate the down payment and monthly payment.
    2. Calculate interest paid back over the term of the loan.
  E. Retirement
    1. Estimate amount of money needed to retire

III. Problem solving with sets.
  A. Set theory terms.

1. Define terms including element, empty set, equal sets, equivalent sets and disjoint sets.
2. Define proper and improper subsets and state examples of each.
    a. Use inductive reasoning to discover pattern for the number of subsets
3. Cardinality of a set, including finite and infinite sets.
4. Use subsets of real numbers to illustrate terminology and review pre-requisite concepts.

B. Calculations with sets.
1. Find unions, intersections and complements.
2. Show set relationships with Venn diagrams.
3. Find cardinality of a set using a Venn diagram.

C. Solving problems using sets.
1. Determine the truth of statements using Venn diagrams.
2. Use Venn diagrams to solve survey problems.
3. Use Boolean searches on internet

IV. Probability.

A. Understanding terms related to probability. (Permutations and combinations only if time)
1. Define terms including experiment, sample space, event, probability of an event and odds in favor of, and against, an event.
2. Consider examples of experiments and events.
3. Calculate the sample space for an experiment in a variety of ways.
    a. Construct a tree diagram.
    b. Construct a lattice diagram. (Rolling two die)
    c. Write sample space as a set and an event as a subset of the sample space.

B. Calculating probability and odds.
1. Apply the fundamental counting principle.
2. Compute simple and compound probability.
    a. Count elements in the event and in the sample space.
    b. Independent versus dependent events.
    c. Mutually exclusive events.
    d. Using theorems to compute compound probabilities.
3. Differentiate between theoretical probability and experimental results.
4. Compute odds.

C. Solve problems using probability and determine mathematics expectation.

V. Using statistics for decision-making.

A. Are the statistics of value?
1. Identifying sampling techniques.
2. Determining correct uses and misuses of statistical data.

B. Displaying statistical data.
1. Constructing a frequency distribution.
2. Construction of circle graphs on paper and/or in Excel.
3. Constructing a stem and leaf display.

C. Calculating statistics.
1. Find and analyze measures of central tendency – mean, median, mode and midrange

2. Calculate measures of dispersion – range and standard deviation

D. Using standards deviations to understand data and solve problems.

1. Calculating z-scores.
2. Using z-scores to compare groups of similar data.
3. The normal distribution.
   a. Determine if a distribution is normal.
   b. Display a normal distribution .
   c. Using the normal distribution to solve problems.

VI. Problem solving with Logic (not construction of truth tables)

B. Apply truth values of basic connectives (conjunction, disjunction, negation, conditional) to analyze real world situations.

1. KenKen puzzles *New Teacher Sign-up: http://kenken.com/signup/teacher.php
2. Use of the connectives (and, or, not) in survey problems using Venn diagrams
3. Use of connectives (and, or, not, if/then) in probability
4. Analyze problems similar to Blitzer bonus page 145 or Spock's logic on page 166. (not using truth tables)
5. Boolean Searches on the Internet
6. Discuss common fallacies in everyday reasoning Page 174
7. Arguments and Euler diagrams

Revised 06/19/2012

Math 1107 Instructor Checklist

- **Send a copy of all tests and finals to Dennine LaRue. One electronic pdf file is preferred.**

- Add Dr. Anthony Gilberti (agilberti) and Dennine LaRue(alarue) as teaching assistants to Blackboard section.

- Blackboard section contains a syllabus with correct contact information, absence policy, and grading policy. See syllabus component page in handbook.

- Upload course outline and objectives into Blackboard.

- Requirement: All grades must be entered in Blackboard on a regular basis.

- Letter grade of D and F reported at the 4 week interval in FELIX. If no students have a D or an F, then grades must be submitted anyway.

- Midterm and Final grades entered in FELIX by the administrative deadline. Watch for announcements in Webmail account.

- All students must complete the enclosed direct assessment measure. Instructors grade the assessments with the Arizona Math Rubric found in the handbook. All student papers are returned with the cover sheet containing average rubric score and number of students to Dennine LaRue within two weeks of administration of the assessment. Number of points toward the student grade is at the discretion of the instructor.

- Have an emergency plan for delivery of the course in case of school closure.

Final Exam Policy (effective Fall 2012)

Since Math 1107 contains five major topics which are vastly different, the math department will no longer require that all students take a comprehensive final.

If students are satisfied with the grade that they will receive based on their work covering the five main topics, they do not need to take the comprehensive final exam.

Students who want to strive for a higher grade may do so by taking a comprehensive department final to prove that they deserve a higher grade.

The department final will be comprised of five parts – Consumer, Set Theory & Patterns, Probability, Statistics, and Getting Financial Life on Track, Ken Ken, & Instructor Preference. See next page for a cover sheet of the final exam. Instructors will be permitted to add two questions of their own preference to the department test for their students.

Test and a key will be emailed during the week prior to exams for reproduction for those wishing to take the test. **It is important for the integrity of the test that the test is <u>secured at all times.</u>**

A different, but similar, test will be distributed during the spring semester.

You should consider types of questions emphasized in your section during the semester to place two questions on the test.

<u>General topics are below. Post course outline in Blackboard. Students can use it to study for exam.</u>

I. **Consumer** – convert between percentage, decimal, and fraction; sale prices; compound and simple interest; abuses of percentages. Formula provided for compound interest.

II. **Set Theory & Patterns** – operations with sets; Venn diagrams; survey problems; identify next terms in a sequence and type of sequence; roster and set builder notation; subsets and formula for finding number of subsets.

III. **Probability** – fundamental counting principal; calculating probability and odds; sample spaces and tree diagrams; theoretical versus experimental probability; compound probability.

IV. **Statistics** – Measures of central tendency; measures of dispersion; calculation and the meaning of standard deviation; calculation and use of z-score; normal distribution and problem solving

V. **Getting Financial Life on Track, Ken Ken, & Instructor Preference** – Essay on Financial Life readings, Ken Ken Puzzles, instructor adds two problems.

Math 1107 Assessment Results

Outcome **# 1** **#2** **#3** **#4**

Semester________________________

Section #________________________

Instructor________________________

Date and time of assessment______________________

Number of Student Participants______________

Mean Arizona Rubric Score__________________

<u>Number of scores</u>

4 ______

3 ______

2 ______

1 ______

0 ______

Fairmont State University

Math 1112 Handbook
Fall 2013 – Summer 2014

May 16, 2013

Math 1112 Coordinator: Dennine LaRue
alarue@fairmontstate.edu
417 Engineering Technology Building
(304) 367-4621

Table of Contents

Items in red are newly updated

Math 1112 Philosophy (05/15/2013)

Math 1112 (College Algebra) is designed to serve several different purposes. Due to the limited number of math faculty at FSU, it is not feasible to design and teach multiple college algebra courses for different tracks. Hence, a single course addresses the goals for a pre-requisite math course and a general education credit while serving as a gateway course to other math classes for students who do not have the required test scores to be admitted directly into those higher-level math classes.

- Math 1112 is a pre-requisite for Applied Statistics (Math 1113), Trigonometry and Elementary Functions (Math 1115), Structure of Real Numbers for Elementary Education majors (Math 2251), and Data Analysis and Geometry for Elementary Education majors (Math 2252). It also serves as a pre-requisite for courses in other departments, such as Business and Economics Statistics (BUSN 3310). Math 1112 is a core requirement for Business.
- Math 1112 is a general studies class. For some students, it is the first and also terminal college credit math course. If a student is taking their final math class, then Math 1112 serves as a culminating course for 12 years of pre-college math classes.

Based on these divergent purposes, the course has several goals:

1) Encourage retention of material taught in pre-requisite courses – either high school or community college.
2) Instruct students on how to read pertinent, precise information from a graph. Knowledge of mathematical terms and grapy analysis can be transferred to other situations such as business indices, learning curves, or Trigonometry and Calculus.
3) Recognize graphs of basic functions with emphasis on non-linear functions.
4) Make connections between algebra skills, functions, and the graphs of functions. Students should be able to analyze relationships between what occurs algebraically and the transformation of the function's graph. Students should be able to state what algebraic change must occur in order to transform the graph of a function.
5) Introduce students to applications of math topics to see a purpose for algebra.
6) Extend characteristics of functions to the exponential function and its inverse, the logarithm which have direct applications in science, technology, and business.
7) Introduce students to various graphing utilities and technology to analyze functions in an efficient manner. (i.e. fooplot.com, Excel, graphing calculators)
8) Apply skills of graph analysis to solve equations and inequalities which involve various functions, both linear and non-linear.

The textbook, College Algebra Essentials by Robert Blitzer, 4th edition is shared with Pierpont CTC's Math 1100(since Fall 2011.) The main chapters covered are 2, 4, and 3, in that order.

- **Chapter 2** introduces functions and graph analysis and is more visually oriented. Transformations of graphs connect the results of algebra skills and graphing techniques.
- **Chapter 4** covers the exponential and logarithmic functions. Most students have little previous exposure to exponential and logarithmic functions and to solving for a variable in the exponent. This chapter incorporates the application of skills learned in Chapter 2 to a new class of functions. Algebra skills are also reviewed.
- **Chapter 3** is a review of the characteristics of quadratic functions. Graph analysis (using x intercepts and boundary points to solve for intervals) is used to solve polynomial, rational, and absolute value equations and inequalities.

Fairmont State University College Algebra B Math 1112
Academic Year 2013-2014 Updated 5-15-2013
Pre-requisites: Math ACT 21, Math SAT 500, Math COMPASS 49 or Math 1100 or Math 1199

FSU College Algebra is an early functions approach using a custom package containing the hardback text *College Algebra Essentials 3e by Robert Blitzer*, purchased through FSU Bookstore. All sections use the same package. Textbook is shared between Math 1100 and Math 1112 in order to save costs . Most students who take Math 1100 are doing so in order to prepare for Math 1112.

VP ISBN 978-1-269-34903-1 only at FSU Bookstore
This is the cheapest way to purchase all components.
Custom Package is based on the complete book Blitzer College Algebra 6e, Pearson, ISBN #978-0-321-84081-3

Custom Package contains:

1. access code for online homework, textbook, video lectures, learning guide via MyLabsPlus (stand alone code is 978-0-558-92680-9)
2. Math Study Skills by Alan Bass (9780321893079)
3. For student convenience the hardback textbook of College Algebra Essentials 4e (9780321833655).
4. Learning Guide for College Algebra worksheets (9780321840790)

Math 1100 Sections- Material not covered in Math1112 by agreement with Pierpont Math Department.

Chapter P
Chapter 1 – partial coverage of sections 1.6
Sections 2.1(minimal), 2.3, 2.4
Sections 5.1 and 5.5
Section 3.3 -- if time allows

Minimal overlap between the two courses—Sections P.1, 1.4, 1.5, 1.7, 2.3. are used as review in Math 1112.

Coordinated Calendar is located on the next two pages.

Math 1112 Coordinated Calendar Fall 2013-Summer 2014

Fall 2013	Math 1112 Sections/Topics coordinated order among all sections	Comments/Special Emphasis
Week 1	Introduction, MLP P.1 – Sets & operations 1.7 – Interval Notation only	Equation versus expression, set builder notation and set terminology, union versus intersection, subsets of complex numbers.
Week 2	1.4 – Complex Numbers **Quiz end of week 2 on P.1, 1.4, 1.7 (early checkpoint)**	Supplement with powers of i.
Week 3	2.1 – Basics of functions & graphs, using interval notation 2.2 – More on functions & graphs	Emphasize Domain and Range. Emphasize reading information from a graph using correct interval notation for answers. Try to relate to graphs seen in business such as the stock market. Even and odd graphically and introduce algebraic method. Difference quotient – lightly to practice use of function notation.
Week 4	2.2 – More Practice 2.3 –Review of only slope intercept form Library of functions (Note cards contain linear, identity, constant, standard quadratic, square root, standard cubic, cube root, absolute value, reciprocal, greatest integer, exponential, logarithmic) 2.5 - Transformations	Emphasize memorization of library of function graphs and transformations. Consider having students make note cards containing graph, domain, range, x intercepts, y intercepts, increasing, decreasing, and constant intervals.
Week 5	2.5 - Transformations Practice graphing piecewise defined functions - Use library of functions and transformations. 2.8 – Only graphing a circle in relation to transformations. More details later during week 15.	Define absolute value as a piecewise defined function. Circles are an application of transformations. For most students this is the first introduction to circles.
Week 6	2.6 – Combinations & Composition of functions 2.7 – Inverse functions	Important for inverse functions. Important for deriving the logarithmic function.
Week 7	2.7 – Inverse functions **Test week 7 on Chapter 2** P.2 & P.3 - Only review rules for exponents – emphasize real numbers, do not need variable exponents	Roots of variable expressions are not as important for chapter 4.
Week 8	4.1 Exponential functions 4.2 Logarithmic functions	New material for all students. Take your time through Chapter 4. Derive log function using inverse function for exponential function. Student need to know characteristics of the functions pages 445 & 460.
Week 9	4.2 Logarithmic functions 4.1 and 4.2 Applications 4.3 Properties of Logarithms	Have students create numerical examples for each of the properties.
Week 10	Extra Practice 4.1 through 4.3 4.4 Exponential & Logarithmic equations	
Week 11	4.5 Exponential Growth & Decay Applications **Test end of week 11 on Chapter 4**	Do a selection of application problems so that the students see a reason for covering this chapter.
Week 12	1.4 - Review square root of a negative number 1.5 – Review charts pages 151, 154, 156	Do not need to include solving quadratic by completing the square. Use completing the square to place in standard form

	3.1 – axis symmetry, factoring & quadratic formula, x, y intercepts, max/min, symmetry points, creating quadratic functions with specific characteristics or zeros	and to derive quadratic formula. Discuss conditional statement of quadratic formula.
Week 13	3.1- Completing square to place in standard form Application problems with Quadratic functions. **Quiz end of week 13 on Quadratic Functions**	Incorporate ideas about functions and the relationship between the graph and the equation. Include a review of transformations when using completing the square to place in standard form. Relate roots of equation to zeros of function and x-intercepts. Find y intercept graphically and algebraically. Create a quadratic or polynomial function given the zeros of the function
Week 14	1.6 Review factoring by grouping Graph analysis to solve equations/inequalities in 3.5, 3.6 &1.7 by graphing f(x) = g(x) or f(x) - g(x) = 0.	Factor polynomial of degree greater than 2 using factoring by grouping. Polynomial Inequalities – Locate x intercepts, use boundary points and graph analysis to determine solution set by selecting intervals which satisfy the given condition. Absolute value equation / inequality – most students express the function compared to zero, but other can look for intersections of f(x) = g(x). Determine appropriate intervals on the x axis which solve the equation/inequality. Reinforce transformations techniques of the absolute value function. Can be related to algebraic method. Sec 3.5 & 3.6 Discuss how vertical asymptotes, indications that the function is undefined at specific values, and zeros of function appear in the graph.
Week 15	2.8 Midpoint formula, distance formula, circles Review solving various nonlinear equations and inequalities algebraically and/or graphically. 1.7 U-substitution (if time) Review for final	Distance formula is not covered in Math 1100. First Introduction for many. May need to review completing the square in section 1.5 to place circle in standard form. Sections 2.5 through 2.8 are needed in Math 1115.
Exam Week	Final exam – Instructor created. One page will be provided as an assessment of one of the course outcomes.	

If additional material is needed consider
Section 3.3 (only synthetic substitution/division)
Review of Area/Volume Formulas (Page 129)
Section 7.1 & 7.2 (as application of transformations)   Chapter 7 is found only in MyLabsPlus.

Math 1112 Course Outline -- Functions Emphasis

(Updated 5/15/2013)

Note: This is not the order of topics. It is organized by outcomes.

I. (Outcome 1) Using appropriate symbolic manipulation skills, perform operations on elements of the real and complex number systems

A. Compare and contrast Algebra topics

1. Proper versus improper form for simplified fractions
2. Exact answers versus estimated answers for rational and irrational numbers
3. Solving equations versus simplifying expressions
4. Division by the constant zero versus division by an expression which equal zero
5. Union versus Intersection
6. -x (opposite of x) versus a negative value for x
7. -3^2 versus $(-3)^2$
8. Compare roots and rational exponents

B. Subsets of the complex numbers

1. Define the Natural, Whole, Integers, Rational, Irrational, Real subsets and identify numbers which belong to each set
2. Review operations of real numbers involving radicals
3. Examine the set of complex numbers
   a. Define %-1 = i
   b. Perform operations on square roots of negative numbers
   c. Define ⎮= { a + bi | a, b 0Y}
   d. Perform addition, subtraction, multiplication, and division of complex number which are not real numbers and write the answer in standard form
4. Complex numbers are not graphed on the real number line, but in an Argand Plane

C. Review Properties of operations on real numbers by proper title

1. Commutative of addition and multiplication
2. Associative of addition and multiplication
3. Distributive of multiplication over addition as rather than acronym FOIL.

II. (Outcome 2) Demonstrate appropriate symbolic manipulation skills to solve non-linear equations and inequalities

A. Solve quadratic equations by factoring using the zero product principle, square root method, and quadratic formula.

B. Use the discriminant to determine the number and type of roots of a quadratic equation

C. Construct quadratic equations with two real roots, one double root, and two complex roots

D. Solve equations by using factoring by grouping and u-substitution

E. Compare the algebraic solution to a quadratic equation/inequality to the graph of the quadratic function

1. Graph a parabola in the form $f(x) = ax^2 + bx + c$ and $f(x) = a(x-h)^2 + c$
2. Locate the vertex, axis of symmetry, maximum or minimum
3. Solve a quadratic inequality by graphing the corresponding quadratic function and selecting intervals which satisfy the conditions

F. Use properties of logarithms

1. Product
2. Quotient
3. Power rules
4. Change of base

G. Solve equations involving exponential and logarithmic functions

III. (Outcome 3) Investigate, model, and solve real world problems involving non-linear functions

A. Quadratic Models

B. Exponential Models

C. Logarithmic Models

IV. (Outcome 4) Use the language of math to define, evaluate, and analyze characteristics of functions

A. Convert between solution set, interval notation, and graphs on the real number line.
    1. Compare and contrast various enclosure symbols and their meanings, such as {2,4},(2,4), [2,4],{4,2},(4,2), [4,2]
    2. Combine intervals using union and intersection and express in simplest form

B. Function notation and terminology
    1. Determine whether ordered pairs, equations, and graphs are relations, functions, and/or one-to-one functions
    2. Determine the domain and range of a function
        a. Defined by a set of ordered pairs
        b. The explicit form of f(x)
        c. Graph
    3. Analyze characteristics of graphs of functions
        a. Use vertical and horizontal line tests to identify functions and one-to-one functions
        b. Determine the open intervals on which function increase, decrease, or are constant
        c. Identify where a function has a local (relative) minimum or maximum and the value of the maximum or minimum
        d. Determine graphically whether a function has x-axis symmetry (never), y-axis symmetry (even), origin symmetry (odd), or no symmetry
        e. Locate x and y intercepts both graphically and algebraically
        f. Identify intervals on a graph where the function is positive or negative

C. Identify and graph common algebra functions
    1. Absolute Value
    2. Linear
    3. Identity
    4. Constant
    5. Standard Quadratic
    6. Square Root
    7. Standard Cubic
    8. Cube Root
    9. Reciprocal
    10. Greatest Integer

D. Analyze domain and range; increasing, decreasing, and constant intervals; and even and odd characteristics of the common algebra functions

E. Use common algebra functions to graph piecewise defined functions

F. Perform operations on functions, including the domain of the new function
    1. Add, subtract, multiply, and divide functions
    2. Composition of functions

G. Inverses of a one-to-one function
    1. Graph the inverse of a one-to-one function
    2. Solve algebraically for the inverse of a one-to-one function
    3. Verify that the functions are inverses algebraically

V. (Outcome 5) Synthesize mathematical knowledge to graph, analyze, and evaluate non-linear functions and relations

A. Apply transformations to graph common algebra functions in the library of functions
    1. Vertical versus horizontal shift
    2. Reflections in the x and the y axis
    3. Shrinking and stretching by a multiplication factor

B. Apply graph analysis to solve quadratic and polynomial equations and inequalities
    1. Use the x intercepts to solve quadratic/ polynomial equations
    2. Use the graph of the corresponding quadratic/polynomial function to solve a quadratic/polynomial inequality by selecting the interval which satisfies the given equality or inequality

C. Apply techniques of transformations to graph absolute value equality and inequalities

1. Solve absolute value equations and inequalities by graphing the function and selecting the solution from the appropriate intervals on the x axis which satisfy the given equality or inequality.
2. Relate the graph to the algebraic solution of the absolute value equations and inequalities

D. Apply the techniques of transformations to the graphing of circles

1. Distance formula
2. Midpoint formula
3. Graphing a circle written in standard form
4. Given the center and the radius, write the equation of a circle in standard form
5. Convert an equation of a circle from general form to standard form by completing the square.

VI. (Outcome 5) Synthesize knowledge of common algebra functions to analyze exponential and logarithmic functions

A. Identify and evaluate exponential and logarithmic functions

B. Graph the exponential and logarithmic functions through transformations

C. Derive the logarithm function from the inverse of the exponential function both graphically and algebraically

D. Identify characteristics of their graphs

1. Asymptotes
2. Intercepts
3. Increasing/decreasing intervals
4. One-to-One functions

<u>Note: If additional material is needed, then</u>

1. Apply synthetic substitution/division to factoring quadratics and difference of two cubes
2. Apply transformations to ellipses, hyperbolas

Pages for Discussion/ Reading Assignments from **Math Study Skills** by Alan Bass (5/31/2013)

A copy of **Math Study Skills** by Alan Bass is included in the custom package for Fairmont State. Many students enrolling Math 1112 need help in some of these areas in order to be successful in Math 1112. An improvement in study skills is likely to positively impact the success of students with the content in College Algebra.

The following pages are to be discussed or assigned in **Math Study Skills** 2nd Edition.

<u>Discuss the following pages during the first few weeks of class:</u>

Pages 1-2	Poor math performance not due to intelligence	**Pages from 1st edition are 2-3**
Page 8	Math is a foreign language	**Page from 1st edition is 10**
Page 11	Difference between high school and college math class	**Page from 1st edition is 13**
Page 12	Attitudes toward math	**Page from 1st edition is 14**
Pages 42-23	Math Learning Styles: Visual/Auditory/Tactile	**Pages from 1st edition is 19-23**
Page 35	Cure for Math Anxiety	**Page from 1st edition is 28**
Page 27	Time Management	**Page from 1st edition is 33**
Page 29	Professor Expectations	**Page from 1st edition is 34**
Page 33	Evaluating Available Study Time	**Page from 1st edition is 39**

<u>Discuss the following pages later in the semester when it is more relative to the content:</u>

Pages 55	How to read a math textbook	**Pages from 1st edition are 48-50**
Pages 58	How to do homework	**Pages from 1st edition are 51-52**
Pages 62	Class Time and Note Taking	**Pages from 1st edition are 54-62**
Page 71	Retention	**Pages from 1st edition are 63-74**
Page 73	Good Note Cards	**Pages from 1st edition are 65-66**
Page 80	Test Taking	**Pages from 1st edition are 75-85**

There are several copies on reserve at the circulation desk in the main campus of Fairmont State for students who purchase only the online textbook. The book is also embedded within MyLabsPlus. Students in Math 2251 and Math 2252 for Elementary Education will need the study skills book in those classes.

If students do not want to keep the book at the end of the semester and are willing to donate it to the Elementary Education Math Library, please collect and return to Dr. Susan Goodwin.

Math 1112 Instructor Checklist 05/15/2013

- Check pre-requisites of students. Some students get into the class without the appropriate pre-requisites for various reasons. Also, some students are placed in a class that is lower than their ability.
  There are two ways to do this.
  - In FELIX >Faculty and Advisors> Instructor Pre-Req Problem Report> choose term, then a list appears containing the names of the students in your class who do not meet the minimum requirements for the class (both test score and transcript.) The transcript can be accessed to view the problem.
  - Every student's test score and transcript can be checked by using FELIX> Faculty and Advisors>Summary class list> choose term> choose class. Click on student name>site map> advisor menu and then either Student Test Score or Student Academic Transcript Order by Term. This method also gives you an idea of the class composition and background. Appropriate advice for math class enrollment can be given with this information. Many students are being placed in the wrong math class for their major. Advisors may not be familiar with the math pre-requisites. The next section contains the pre-requisites for all 1000 level classes.
  - <u>All instructors are to check the Pre-Req Problem Report and remove any students who do not meet the pre-requisites</u>. If you find students who will not willingly move to the appropriate class, they can be administratively removed by the end of the second day of class. Watch for an email from Evie Brantmeyer, Registrar with instructions.
  - <u>At first class period, determine if students took Web Algebra and/or Web Trig from either WVU or FSU while they were in high school. If they passed, they can enroll in a higher level math class or may have already met their math credit provided they transfer the credits to FSU.</u>

- Blackboard section must contain a syllabus with correct contact information, absence policy, and grading policy. Handbook contains a more detailed list of what must be in the syllabus. Part of this will be entered into your Blackboard section by the Math 1112 coordinator, but you need to add personal information.

- All grades must be entered in Blackboard.

- Add agilberti and alarue as teaching assistants in Blackboard.

- Letter grade of D and F reported at the 4 week interval in FELIX. If no students have a D or an F, then you must submit the blank grades anyway.

- Midterm and Final grades entered in FELIX by the administrative deadline. Watch for an email with the dates from Evie Brantmeyer, Registrar.

- All students must complete the direct assessment measure. In general, instructors grade the assessments with the Arizona Math Rubric found in the handbook. The rubric score is entered in a specific column at the beginning of the Blackboard gradebook. All student papers are returned to Dennine LaRue. Number of points toward the student grade is at the discretion of the instructor. Deadline for submission of the results will vary depending when assessment is given.

- Students are to complete homework in MyLabsPlus to improve skill levels. Instructors are encouraged to use worksheets or other problems from the text which are at the synthesis and analysis level of Bloom's Taxonomy. All students are initially enrolled in this program by IT. Students have to verify registration after purchasing book package of the access code. They do not populate the permanent grade book until they sign in to the MLP class. Temporary access can be granted by the program for 21 days. Student's initial login is the school username and the word "password" for the password. If a student was in Math 1100, the password is the same as it was the previous term. Students should change the password after the initial login.

- Students can purchase the textbook package at the FSU bookstore, but some students may prefer to purchase only the online access to MyLabsPlus. The textbook is part of the online component. **Tell students to compare prices before making a purchase.** Students can purchase the online access at checkout in the bookstore or directly from Pearson at www.fsupierpont.mylabsplus.com The text is a new edition so there will not be any used books available.

- If a student is repeating Math 1112, have them discuss the access with Dennine LaRue before purchasing another code. We should be able to get some codes from Pearson to grandfather students into the program.

- There is a review test available in MyLabsPlus – Elementary Algebra Review Test Although not a requirement, encourage students to use these tests as a refresher to increase their algebra skill level and to become familiar with the program.

- Have an emergency plan for delivery of the course in case school closure or illness. MyLabsPLus will serve as the backup delivery of the course in case of school closures, so all students should become familiar with the program.

- Incorporate application problems and the use of graphing utilities. The following are excellent
  - www.fooplot.com
    (highly recommended)
  - Scientific calculators for Chapter 4.
  - Graphing calculators (at the end of semester)
  - http://shodor.org/interactivate/activities/slopeslide
  - http://shodor.org/interactivate/activities/functionflyer
  - http://www.shodor.org/interactivate/activities/MultiFunctionDataFly/
  - Applets for graphing a circle: **Use this website only in campus labs. It locked up some student's laptops.** http://www.ltcconline.net/greenl/java/IntermedCollegeAlgebra/circleGraph/circleGraph.htm
  - Conics http://www.shodor.org/interactivate/activities/ConicFlyer/?version=1.5.0_06&browser=MSIE&vendor=Sun_Microsystems_Inc.
  - Visualize composition of functions: http://www.ltcconline.net/greenl/java/IntermedCollegeAlgebra/FunctionOps/FunctionOps.html

    Be aware that many students use http://www.wolframalpha.com/ to get help with their homework.

Fairmont State University Pre-requisites:

Math 1101 – ACT >= 19
SAT <= 460
COMPASS Algebra >= 36
Pierpont: Math 0095 credit or Math Module 0088

Math 1102 --	Math 1101 with a C or higher
Math 1107 --	ACT >= 19 SAT >= 460 COMPASS Algebra >= 36 Pierpont: Math 0095 credit or Math Module 0086
Math 1112 --	ACT >= 21 SAT >= 500 COMPASS Algebra >= 49 Pierpont: Math 1100 credit FSU: Math 1199 credit
Math 1115 --	ACT >= 23 SAT >= 540 COMPASS Algebra >= 63 FSU: Math 1112 with a C or higher
Math 1185 --	ACT >= 24 SAT >= 560 COMPASS Algebra >= 67 FSU: Math 1115 FSU: Math 1102 with an A or B
Math 1190 --	ACT >= 25 SAT >= 570 COMPASS Algebra >= 73 FSU: Math 1115, 1170, 1186

NOTE: ACT and SAT scores are valid for 5 years. COMPASS scores are valid for 2 years only! The date of the student test is found in FELIX under Faculty Advisors Menu>Student Test Scores.

Updated7/01/2012

MyLabsPlus Information, Instructions, Policies **Updated 5-15-2013**

Math 1112 Custom Package at FSU Bookstore contains 4 components effective Fall 2013:

1. *College Algebra Essentials 4e*
2. *Math Study Skills workbook*

3. *Folder containing the MyLabsPlus access code. Access code is the required purchase and can be purchased separately at checkout or online as the website.*
4. *Learning Guide which contains samples problems and additional worksheets for each section.*

Dennine LaRue is the Fairmont State administrator of MyLabsPlus for Math 1112. The administrator creates the terms and courses, registers faculty into their courses, resets passwords if students (or faculty) forget them, adds students who enter the course, deletes students who drop the course, etc.

A common website has been built for Pierpont CTC Math 1100 and Fairmont State University Math 1112 since the same textbook is shared between the two courses. **Please have students register at the site immediately or have them use the temporary access while waiting to purchase the package.**

- The website is called www.fsupierpont.mylabsplus.com.
- **Student must bookmark the website**. It cannot be found through an internet search. It is better to access the site directly, rather than with a link in blackboard.
- On the website, enter login name and password. The login name for students will be their UCA username. The password will be the word "password" initially. Students should change their password after they have entered the course. If a student has been in the site previously, use the changed password.
- Student names will be uploaded into the appropriate Math 1112 section by Fairmont State IT personnel. This operation is performed once prior to the term and once at the end of the add period. Alternately, you can send Dennine LaRue the complete email address to be added.
- The permanent grade book is not populated until a student accesses the course, clicks on any link, and enters the MyLabsPlus verification code. To see which students are in temporary storage, but are not yet in the grade book use the tool bar across the top of the course >course admin>course enrollment.

One course will appear in the appropriate semester menu.

Math 1112 Semester INSTRUCTOR Sec #

- The Math 1112 college algebra section with the instructor name and section number is the portal to access MyMathLab which holds the homework and quizzes associated with sections in the textbook, Blitzer College Algebra textbook It also contains two additional chapters on Sequences and Series and Conic Sections which are not in the hardback Essentials text.
- In the homework assignments, students can get help on the problems. Quizzes and tests do not have access to the help menu. Class lecture videos are available if a student misses a class.
- At the bottom of the left menu pane, there are **two important icons**. The house sends students back to the home entry page and the key is the log out.

Once a student enters the course, they are prompted for an access code.

- If they have not purchased the package or an access code yet, temporary access can be gained for exactly 21 days using the button on the left menu that says Temporary Access.
- Exactly at the end of 21 days, students are prompted again for the access code and all previous grades will be saved. It cannot be entered earlier.

- Purchasing the code/package is preferable, rather than using the temporary access if at all possible. If financial aid will be delayed more than the first week of classes, then students are to use the temporary access code.

Dennine LaRue developed course material which is currently in your course. As instructor, you have the ability to create material and set due dates. Due dates should be set on each chapter to keep students up to date.

Advantages:

1. Students can work the problems more than once because the values are regenerated in each attempt. Be aware that a student may take triple the estimated time listed in MyLabsPlus to complete an assignment.
2. Immediate feedback provided as to correctness of the answer and hints to encourage solving the problem.
3. Options such as "help me solve it" or "show me an example" provide hints.
4. MyLabsPLus is a backup delivery of the course in case school closure or instructor illness. All students must become familiar with the program.
5. A review test is available in the Math 1112 course of MyLabsPlus – Elementary Algebra Review Test. It is a good way to refresh basic algebra skills and to become familiar with the online program.

Disadvantages:

1. Students become dependent on the help and can complete problems online, but not on paper tests in class.
2. The instructor needs to clear the study plan as of the first day of the semester for students who were enrolled in Math 1100. The study plan is used extensively in that class and carries over into the next semester. This cannot be completed until students are registered into the program. Once study plan is cleared for students who took Math 1100, the program identifies what they need to study if they take any quizzes.

Other Policies

- ✓ A greater percentage of students are now choosing to do their homework online because of the hints and immediate feedback. Instructors are to require students to keep a notebook of all their work. It is not sufficient to only enter answers in the homework program. Some problems are mental math, but a large portion of the problems require work in order to solve. Students need to learn how to write and express themselves mathematically using correct notation and terminology. Work should be collected for any assignments graded in MLP.
- ✓ All sections have access.
- ✓ Off campus and new instructors are to use the homework feature in order to be consistent with content level.
- ✓ If a student chooses not to purchase the access, then homework/quizzes/assessments will be a grade of zero. Students may choose to purchase only the access code which contains

the ebook. Student should consider whether they want the hard back text. Encourage students to compare prices before purchasing materials.

- ✓ Use of study plan is not required.
- ✓ Tests are to require more than the skill levels associated in MyLabsPlus on some problems. The quality of the student work is graded as well as the correct answer. Hence, student grades should not be derived from taking tests in MyLabsPlus at times outside of class. Work should always be submitted to correspond with the problems in MyLabsPlus. Partial credit should be awarded.

TAB 6

Appendix D

Survey Results

Summary Results of Employer Survey

Four of the sixteen eligible employers responded to the survey as of February 10, 2014.

Question 1 of the Employer Survey is census information and the results are not included in the following summary.

2. Please rate each of the following regarding the graduate's ability to communicate effectively:	Strongly Agree	Agree	Disagree	Strongly Disagree
The graduate is able to prepare and write professional reports.	75.0 %	25.0 %	0 %	0 %
The graduate can verbally communicate his/her ideas.	75.0 %	25.0%	0 %	0 %
The graduate is able to present material effectively.	100.0 %	0 %	0 %	0 %
3. To be a more effective communicator, he/she would have to:				
Employer Comments: 1. "She does a great job!" 2. "Build interpersonal skills which she is very capable of." 3. "I am pleased with her communication skills." 4. "She has become a leader in our area and a great communicator."				
4. Please rate each of the following regarding the graduate's ability to apply his/her knowledge:				
The graduate has the knowledge base needed for the job.	75.0 %	25.0%	0 %	0 %
The graduate has demonstrated an ability to apply his/her knowledge and skills in the workplace.	75.0 %	25.0%	0 %	0 %
The graduate is able to conceptualize problems related to field of expertise.	75.0 %	25.0%	0 %	0 %
7. To be more effective in applying one's knowledge, he/she would have to:				

Employer Comments: 1. “Needs nothing. Great teacher!” 2. “Gain experience.” 3. “One of the best teachers I have worked with.” 4. She works well with others and can apply her knowledge in a collegial manner.”				

Summary Results of Likert Scale Perception questions from the Graduate Survey

Twenty-three of the fifty-four eligible graduates responded to the survey as of February 10, 2014.

Question	Very well	Above Ave	Ave	Below Ave	Not at all
10. Please rate how you perceive the mathematics education you received at FSU prepared you for employment.	33.3 %	57.2 %	9.5 %	0 %	0 %
Graduate Comments: 1. "I was able to get a teaching job very quickly and I feel that I have the math knowledge necessary to succeed at my job." 2. "I teach math and although I've always been "good" at math, without the math courses and math education courses at FSU, my first year would have been rough (to say the least). I am very thankful for the professors and mathematics education I received at FSU."					
12. Please rate how you perceive the mathematics education you received at FSU prepared you for employment as compared to your colleagues.	20.0 %	73.3 %	6.7 %	0 %	0 %
Graduate Comments: 1. "I feel that in my short time working with my colleagues that I was easily as prepared as many and more prepared than most who went through similar programs at other institutions of higher learning." 2. "My mathematical background puts me 3 steps ahead of the rest of my peers in computer science."					
14. Please rate how you perceive the mathematics education you received at FSU prepared you for graduate school or further academic studies.	23.1 %	61.6 %	7.7 %	7.7 %	0 %

Graduate Comments: 1. “I think the hard work that had to be put in to be successful if the math department prepared me for other academic studies. It has been extremely helpful in action research when collecting and analyzing data.” 2. "I felt much more prepared than most of the other students in my program. I had a much stronger background in proof than many other students. "					
17. Please rate how you perceive the mathematics education you received at FSU prepared you for graduate studies as compared to your colleagues.	0 %	75.0 %	25.0 %	12.5 %	0 %
Graduate Comments: 1. "I felt that my proof writing skills were superior to my colleagues because I didn't make leaps and unnecessary assumptions." 2. "I had a much better understanding of data and statistics to use in my action research project."					

TAB 7

Appendix E

Students Meeting Graduation Requirements For Math and Math Ed. Degrees

Number	Student F number	Semester of Graduation	Required Courses									One Science Course				Group A -- Choose One		Group B - Choose Two					Miscellaneous Math Courses											
			MATH 1190	MATH 2200	MATH 2212	MATH 3315	MATH 3316	MATH 3335	MATH 3361	MATH 3362	COMP 1102	CHEM 1101	CHEM 1105	PHYS 1101	PHYS 1105	MATH 3375	MATH 3391	MATH 2206	MATH 2216	MATH 3342	MATH 3372	MATH 4401	MATH 1107	MATH 1112	MATH 1113	MATH 1115	MATH 1170	MATH 1185	MATH 1199	MATH 2251	MATH 2252	MATH 3353	MATH 4400	MATH 4431
1	F0010 2506	Sp 13	x	x	x	x	x	x	x	x	x			x		x	x	x	x		x	x		t	x	t								
2	F0019 2872	Sp 13	x	x	x	x	x	x	x	x	x	x					x		x		x				x				x					x
3	F0018 5603	Sp 13	x	x	x	x	x	x	x	x	x	x					x		x		x													x
4	F0023 6525*	Sp 13						x																										
5	F0019 8250	Sp 13	x	x	x	x	x	x	x	x	x		x				x		x		x													x
6	F0020 0170	Sp 13	x	x	x	x	x	x	x	x	x			x		x			x			x												
7	F0006 1114	Sp 13	x	x	x	x	x	x	x	x	x	x	x			x		x			x			x		x								
8	F0010 2544	Sp 13	x	x	x	x	x	x	x	x	x	x					x		x		x			x										x
9	F0013 1675	Sp 13	x	x	x	x	x	x	x	x	x		x	x		x	x	x	x			x												
10	F0015 9903*	Sp 13	x	x															x					t	x	t				x	x	x		x
11	F0018 8213*	Sp 13																	x					x	x	x				x	x	x		x

*5-9 student
**MAT student

Number	Student F number	Semester of Graduation	Required Courses									One Science Course				Group A -- Choose One		Group B - Choose Two					Miscellaneous Math Courses											
			MATH 1190	MATH 2200	MATH 2212	MATH 3315	MATH 3316	MATH 3335	MATH 3361	MATH 3362	COMP 1102	CHEM 1101	CHEM 1105	PHYS 1101	PHYS 1105	MATH 3375	MATH 3391	MATH 2206	MATH 2216	MATH 3342	MATH 3372	MATH 4401	MATH 1107	MATH 1112	MATH 1113	MATH 1115	MATH 1170	MATH 1185	MATH 1199	MATH 2251	MATH 2252	MATH 3353	MATH 4400	MATH 4431
12	F0006 2870	F 12	x	x	x	x	x	x	x	x	x			x			x		x		x	x	x		x				x					x
13	F0015 3580*	F 12																	x						t	x				x	x	x		x
14	F0014 0732	S 12	x	x	x	x	x	x	x	x	x			x			x	x	x															
15	F0012 0840*	Sp 12	t																x						x	x				x	x	x		x
16	F0020 5103	Sp 12	t	x	x	x	x	x	x	x	x	t				x			x		x			t		t								x
17	F0020 0510	Sp 12	t	x	t	t	t	t	x	x	t			t			x				x	x												
18	F0000 4505	Sp 12	x	x	x	x	x	x	x	x	x	x					x	x	x															
19	F0018 6818	Sp 12	x	x	x	x	x	x	x	x	x	x					x	x	x		x			x		x								
20	F0013 7765	Sp 12	x	x	x	x	x	x	x	x	x			x			x	x	x								x							
21	F0017 3061	Sp 12	x	x	x	x	x	x	x	x	x	x				x			x		x			x		x								x
22	F0017 6054	Sp 12	t	x	x	t	x	x	x	x	x			t		x			x		x			x										x
23	F0012 0840*	Sp 12	t																x						x	x				x	x	x		x
24	F0004 633*	Sp 12																	x					x	x	x				x	x	x		x

Number	Student F number	Semester of Graduation	Required Courses									One Science Course				Grp A -- Choose 1		Group B - Choose 2					Miscellaneous Math Courses											
			MATH 1190	MATH 2200	MATH 2212	MATH 3315	MATH 3316	MATH 3335	MATH 3361	MATH 3362	COMP 1102	CHEM 1101	CHEM 1105	PHYS 1101	PHYS 1105	MATH 3375	MATH 3391	MATH 2206	MATH 2216	MATH 3342	MATH 3372	MATH 4401	MATH 1107	MATH 1112	MATH 1113	MATH 1115	MATH 1170	MATH 1185	MATH 1199	MATH 2251	MATH 2252	MATH 3353	MATH 4400	MATH 4431
25	F00134 469	Sp 11	x	x	x	x	x	x	x	x	x	x				x			x		x			t		x								
26	F00191 152	Sp 11	x	x	x	x	x	x	x	x	x	x				x			x		x					x								
27	F00185 471	Sp 11	x	x	x	x	x	x	x	x	x	x				x		x	x							x	x							
28	F00164 336	Sp 11	x	x	x	x	x	x	x	x	x	x					x		x		x				x	x								x
29	F00169 496**	Sp 11		x	x				x								x		x		x													x
30	F00134 705*	Sp 11																	x					t	x	x				x	x	x		x
31	F00088 353	Sp 11	x	x	x	x	x		x		x	x							x				x	x	x	x				x	x	x		x
32	F00136 258*	Sp 11																	x					x	x	x		x		x	x	x		x
33	F00054 001*	Sp 11																	x					x	x	x				x	x	x		x
34	F00160 735*	Sp 11						t											x							x				x	x	x		x
35	F00088 982	F 10	t	x	x	x	x	x	x	x	x	t				x	x		x		x		x	x		x								x
36	F00047 023*	F 10																	x				t	x	x	x		x		x	x	x		x
37	F00134 183*	F 10	t					t											x							t				x	x	x		x
38	F00163 219	F 10	x	x	x	x	x	x	x	x	x	x				x			x		x													x

Number	Student F number	Semester of Graduation	Required Courses									One Science Course				Grp A -- Choose One		Group B - Choose Two					Miscellaneous Math Courses											
			MATH 1190	MATH 2200	MATH 2212	MATH 3315	MATH 3316	MATH 3335	MATH 3361	MATH 3362	COMP 1102	CHEM 1101	CHEM 1105	PHYS 1101	PHYS 1105	MATH 3375	MATH 3391	MATH 2206	MATH 2216	MATH 3342	MATH 3372	MATH 4401	MATH 1107	MATH 1112	MATH 1113	MATH 1115	MATH 1170	MATH 1185	MATH 1199	MATH 2251	MATH 2252	MATH 3353	MATH 4400	MATH 4431
39	F0009 5878	Sp 10	x	x	x	x	x	x	x	x	x			x		x			x		x						x		x				x	x
40	F0003 9934	Sp 10	x	x	x	x	x	x	x	x	x			x		x			x	x														
41	F0019 9886	Sp 10	t	x	x	t	t	x	x	x	x	x				x			x		x													
42	F0009 1318*	Sp 10																	x					x	x	x		x		x	x	x		x
43	F0010 6371	F 09	x	x	x	x	x	x	x	x	x			x		x			x	x	x	x					x							x
44	F0008 6803	F 09	x	x	x	x	x	x	x	x	x	x				x			x			x				x								
45	F0001 4111	Sp 09	t	x	x	t	x	t	x	x	x	x					x		x		t													x
46	F0009 5622	Sp 09	x	x	x	x	x	x	x	x	x										x													x
47	F0009 1326	Sp 09	x	x	x	x	x	x	x	x	x	x				x			x		x		x	x	x	x								
48	F0008 9806	Sp 09	x	x	x	x	x	x	x	x	x			x		x			x		x			x	x					x	x			
49	F0009 7996	Sp 09	x	x	x	x	x	x	x	x	x			x		x	x	x	x	x	x	x							x x					

Number	Student F number	Semester of Graduation	Required Courses									One Science Course				Group A -- Choose One		Group B - Choose Two					Miscellaneous Math Courses											
			MATH 1190	MATH 2200	MATH 2212	MATH 3315	MATH 3316	MATH 3335	MATH 3361	MATH 3362	COMP 1102	CHEM 1101	CHEM 1105	PHYS 1101	PHYS 1105	MATH 3375	MATH 3391	MATH 2206	MATH 2216	MATH 3342	MATH 3372	MATH 4401	MATH 1107	MATH 1112	MATH 1113	MATH 1115	MATH 1170	MATH 1185	MATH 1199	MATH 2251	MATH 2252	MATH 3353	MATH 4400	MATH 4431
50	F0009 9192	Sp 09	x	x	x	x	x	x	x	x	x			x		x		x	x	x		x		x		x	x							
51	F0008 0714	Sp 09	x	x	x	x	x	x	x	x	x			x		x		x	x					x		x				x	x	x		x
52	F0008 2760	Sp 09	x		x	x	x	x	x	x	x	x							x		x						x							x
53	F0007 7000*	Sp 09	x										x						x						x	x				x	x			x
64	F0007 6180	F 08	x	x	x	x	x	x	x	x	x	x					x		x		x			x	x									x
55	F0004 7342	S 08	t	x	x	x	x	x	x	x	x		x			x x x	x	x	x		x	x							x x					x

Tab 8

Appendix F

NCATE Criteria And Results

PART B—STATUS OF MEETING NATIONAL STANDARDS

NCTM STANDARD

Mathematics Preparation for All Mathematics Teacher Candidates

1. Knowledge of Problem Solving. Candidates know, understand and apply the process of mathematical problem solving.
Met
Comments: None

2. Knowledge of Reasoning and Proof.
Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.
Met
Comments: None

3. Knowledge of Mathematical Communication.
Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others.
Met
Comments: None

4. Knowledge of Mathematical Connections.
Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.
Met
Comments: None

5. Knowledge of Mathematical Representation.
Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.
Met
Comments: None

6. Knowledge of Technology.
Candidates embrace technology as an essential tool for teaching and learning mathematics.
Met
Comments: None

7. Dispositions.
Candidates support a positive disposition toward mathematical processes and mathematical learning.
Met
Comments: None

8. Knowledge of Mathematics Pedagogy.
Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning
Met
Comments: None

Mathematics Preparation for Secondary Level Mathematics Teacher Candidates

9. Knowledge of Number and Operations.
Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and the meaning of operations.
Met
Comments: **None**

10. Knowledge of Different Perspectives on Algebra.
Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.
Met
Comments: **None**

11. Knowledge of Geometries.
Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.
Met
Comments: **None**

12. Knowledge of Calculus.
Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of the calculus.
Met
Comments: **None**

13. Knowledge of Discrete Mathematics.
Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.
Met
Comments: **None**

14. Knowledge of Data Analysis, Statistics, and Probability.
Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.
Met
Comments: **None**

15. Knowledge of Measurement.
Candidates apply and use measurement concepts and tools.
Met
Comments: **None**

Field-Based Experiences for Secondary Level Mathematics Teacher Candidates

16.1 Field-Based Experiences
Engage in a sequence of planned opportunities prior to student teaching that includes observing and participating secondary mathematics classrooms under the supervision of experienced and highly qualified teachers.
Met
Comments: None

16.2 Field-Based Experiences
Experience fulltime student teaching secondary-level mathematics that is supervised by an experienced and highly qualified teacher and a university or college supervisor with elementary mathematics teaching experience.
Met
Comments: None

16.3 Field-Based Experiences Demonstrate the ability to increase students' knowledge of mathematics.
Met
Comments: None