

Eastern Wyoming College

Instructional Program Review 2017-2018

Program: Mathematics Cluster

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EASTERN WYOMING COLLEGE Mathematics Program Review

Program Name: Mathematics

Part I: Statistical Data from the past three years:

	2014-2015	2015-2016	2016-2017	5-year Average
Annualized FTE Enrollment	152.5	143.4	140.9	140
Annualized FTE Faculty	15.0	13.0	10.5	12.9
Number of Students	4	6	6	5
Number Graduated	1	2	0	0.8

Modes of Delivery:

online face-to-face

Student Access Points: The majority of our Mathematics students enter as traditional freshmen, some of whom have completed concurrent enrollment courses. The non-traditional students who enter the program may have completed previous college course work.

Community Partners or Internships: Coordination with regional high school to sponsor and host the annual Wolzborn-Drazovich Memorial State Math Contest.

Revisions in Curriculum Since Last Review:

- In 2018, the wording regarding the credentialing for MATH 1515 instructors was clarified: A **bachelor's degree** with concentration in Mathematics, Secondary Mathematics Education, Statistics, or related field including, but not limited to, Engineering, Physics, Biostatistics, Computational Biology, Scientific Computing, Economics, or Computer Science.
- Fundamentals of Statistics course, STAT 2050, was moved from the Business department into the Mathematics department beginning FALL 2016.
- MATH 0903, Bridge Mathematics, course name was changed to Pre-Algebra Arithmetic effective 2017-2018 catalog.

Part II Narrative Analysis

Description of Community Need:

The mathematics department is a service-oriented department. The department offers courses that support nearly all programs at EWC. We have classes for the AAS programs such as Math 1515, Applied Technical Mathematics, used in welding and ag programs. The department also offers a sequence of developmental classes to prepare students for college level classes. This sequence of classes has been modified to support the mission of Complete College America. We believe that the modifications we have made to these courses will “Improve student programs through gateway courses and into programs of study that lead quickly and efficiently to completion” and allow them to take college level courses in their first year. The department also

offers a robust selection of courses for both math intensive programs with a standard STEM program as well as minimal math requirements, such as problem solving.

As part of the concurrent and dual enrollment program in Wyoming, EWC has been able to offer many classes in the high school in our outreach areas. The tables below show the town and classes offered and the number of credits issued to students taking those courses. It is clear that the outreach classes are important to the mathematics department at EWC.

School Year 2014-2015

Fall 2014	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	Douglas, Newcastle, Torrington, On-line
Intermediate Algebra	Douglas, Guernsey, Wheatland, On-line
Problem Solving	Douglas, Glendo, Glenrock
Math for Elem. T's I	On-line
Pre-Calc Algebra	Douglas, Glendo, Hulett, Lusk, Moorcroft, Newcastle, Sundance, Torrington, On-line
Pre-Calc Trig	Newcastle
Algebra & Trig	Wheatland
Calculus I	Douglas, Sundance, Wheatland
Calculus II	
Intro Stats for Soc Sci	On-line

Credits: F2F 874; On-line 144

Spring 2015	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	Douglas, On-line
Intermediate Algebra	Douglas, Lingle, Newcastle, Torrington, On-line
Problem Solving	Hulett, Wheatland, On-line
Math for Elem. T's II	On-line
Pre-Calc Algebra	Douglas, Glenrock, Douglas
Pre-Calc Trig	Douglas, Glendo, Hulett, Lusk, Moorcroft, Sundance, Torrington, Wheatland
Algebra & Trig	Wheatland
Calculus I	
Calculus II	Torrington
Fund. of Statistics	Douglas, On-line

Credits: F2F 654; On-line 240

Summer 2015	Towns where course was offered & On-line when applicable
Pre-Algebra	
Elementary Algebra	On-line
Intermediate Algebra	On-line
Problem Solving	On-line
Pre-Calc Algebra	
Pre-Calc Trig	On-line
Calculus I	
Calculus II	
Fund. of Statistics	

Credits: On-line 113

School Year Totals – Credits: F2F 1528; On-line 497

School Year 2015-2016

Fall 2015	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	Douglas, Guernsey, Newcastle, Torrington, On-line
Intermediate Algebra	Douglas, Lusk, Upton, On-line
Problem Solving	Douglas, Glendo, Glenrock, On-line
Math for Elem. T's I	On-line
Pre-Calc Algebra	Douglas, Glendo, Hulett, Lusk, Moorcroft, Newcastle, Sundance, Torrington, On-line
Pre-Calc Trig	Newcastle
Calculus I	Torrington, Douglas, Sundance
Calculus II	
Fund. of Statistics	

Credits: F2F 796; On-line 293

Spring 2016	Towns where course was offered & On-line when applicable
Pre-Algebra	Newcastle
Elementary Algebra	Douglas, Newcastle, On-line
Intermediate Algebra	Torrington, Newcastle, Douglas, Guernsey, On-line
Problem Solving	Upton, On-line
Math for Elem. T's II	On-line
Pre-Calc Algebra	Douglas, Glenrock, Guernsey, Lusk
Pre-Calc Trig	Douglas, Glendo, Hulett, Lusk, Moorcroft, Sundance, Torrington, On-line
Calculus I	
Calculus II	Torrington
Fund. of Statistics	On-line, Douglas

Credits: F2F 628; On-line 247

Summer 2016	Towns where course was offered & On-line when applicable
Pre-Algebra	
Elementary Algebra	On-line
Intermediate Algebra	On-line
Problem Solving	On-line
Pre-Calc Algebra	Douglas
Pre-Calc Trig	On-line
Calculus I	
Calculus II	
Fund. of Statistics	

Credits: F2F 16; On-line 126

School Year Totals:
 Credits: F2F 1440
 On-line 666

School Year 2016-2017

Fall 2016	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas
Elementary Algebra	Douglas, Guernsey, Lusk, Newcastle, On-line
Intermediate Algebra	Douglas, Glendo, On-line
Problem Solving	Douglas, Glendo, On-line
Pre-Calc Algebra	Douglas, Glendo, Hulett, Lusk, Moorcroft, Torrington, On-line
Pre-Calc Trig	On-line
Algebra and Trig	Guernsey
Calculus I	Douglas, Torrington
Calculus II	
Fund. of Statistics	Douglas

Credits: F2F 956; On-line 177

Spring 2017	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	On-line
Intermediate Algebra	Douglas, Guernsey, Lusk, Newcastle, On-line
Problem Solving	On-line
Pre-Calc Algebra	Douglas, Glendo, Torrington
Pre-Calc Trig	Douglas, Glendo, Hulett, Lusk, Moorcroft, Torrington, On-line
Calculus I	
Calculus II	
Fund. of Statistics	Douglas, On-line

Credits: F2F 540; On-line 225

Summer 2017	Towns where course was offered & On-line when applicable
Pre-Algebra	
Elementary Algebra	Newcastle, On-line
Intermediate Algebra	On-line
Problem Solving	On-line
Pre-Calc Algebra	
Pre-Calc Trig	On-line
Calculus I	
Calculus II	
Fund. of Statistics	On-line

Credits: F2F 9; On-line 124

School Year Totals

Credits: F2F 1505

On-line 526

School Year 2017-2018

Fall 2017	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	Douglas, Guernsey, Newcastle, On-line
Intermediate Algebra	Douglas, Newcastle, On-line
Problem Solving	Douglas
Pre-Calc Algebra	Douglas, Hulett, Lusk, Moorcroft, Torrington, On-line
Pre-Calc Trig	On-line
Calculus I	
Calculus II	
Fund. of Statistics	

Credits: F2F 665; On-line 118

Spring 2018	Towns where course was offered & On-line when applicable
Pre-Algebra	Douglas, Newcastle
Elementary Algebra	Newcastle, On-line
Intermediate Algebra	Douglas, Guernsey, Newcastle
Problem Solving	On-line
Math El T's I	On-line
Pre-Calc Algebra	Douglas, On-line
Pre-Calc Trig	Douglas, Guernsey, Hulett, Lusk, Torrington, On-line
Calculus I	
Calculus II	
Fund. of Statistics	Douglas, On-line

Credits: F2F 521; On-line 276

YTD Total

Credits: F2F 1186

On-line 394

Activities in Support of Student Recruitment and Retention

The mathematics department hosts the Annual Wolzborn-Drazovich Memorial Math Contest where approximately 150 students attend and take the test. We award one four-semester tuition scholarship. Science Division scholarships are used as recruiting tools – they are primarily awarded to incoming freshmen, but each year some are awarded to returning students, which aids in retention of students who have been very successful in their freshmen course work.

Assessment of Student Learning:

During this review period we have had few math majors. Until EWC puts Computer Science courses into its curriculum, we will struggle to have math graduates. Students who complete our Associates Degree in Mathematics are prepared well for their upper level mathematics courses, but are behind in computer and data science courses when they transfer. This is an especially pressing need as the K-12 curriculum in Wyoming begins to include computer science.

It is important, however, that while we have few graduates in mathematics, our department impacts 100% of EWC graduates. We now offer more sections of courses as well as block sections so that students may complete their entire developmental requirements in one semester, instead of taking one year to fulfill those requirements. The full-time math instructor in Douglas

has provided face-to-face instruction for students on the Douglas campus, and has given the department more faculty to teach on-line courses.

All faculty in the math department consistently utilize and report on Classroom Assessment Techniques as well as Course Assessments to improve the quality of teaching and the assessment of learning. These allow us to look at what we are doing to determine if it is effective. We also complete Capstone and Program Reviews when we have graduates to determine if there are any ways to make our program better and our students more prepared for transfer.

Strengths of the Program and Faculty:

Program Strengths:

One program strength is that the math faculty are teaching developmental as well as transferrable classes. This provides for easier transition into the college level courses in order to help students be successful. Most of our developmental courses are offered both face to face and online, to meet the varying needs of students. Another strength is that several class sizes are small, making the student-teacher ratio lower. This enables the student to get more personalized attention in the classroom and have greater achievement with the content. Moreover, Fundamentals of Statistics, STAT 2050, is being taught by Math and Statistics faculty since 2016. The course has been modified to align more into the application side of Statistics by having the students do some projects using technology, more specifically using MS-Excel, which is freely available for the students of EWC. Attempts have been made to align the course to meet the Guidelines for Assessment and Instruction in Statistics Education (GAISE) in Statistics Education (GAISE) College Report College Report 2016, as endorsed by the American Statistical Association. All the continuous changes in the course are highly motivated from the recent demands and advancements in the area of data science and Applied Statistics. Finally, we are in the process of adopting a 2+2 agreement with the University of Wyoming, meaning that our mathematics graduates will seamlessly transfer to the university after completing their mathematics degree here.

Faculty Strengths:

The department has four, qualified full-time faculty members, two of which are new. Three of the four faculty members hold a master's degree in mathematics, and/or mathematics education with a minimum of 18 graduate hours in mathematics, and one faculty member holds a PhD in mathematics. Adjunct and concurrent instructors also typically hold a master's degree or have at least 18 graduate hours in mathematics. Our mathematics faculty are committed to helping students achieve their educational goals and are supportive of one another in professional endeavors. Two of our current faculty serve as state officers of the Wyoming Mathematical Association of Two-Year Colleges (WyMATYC). The faculty collaborate on curriculum, textbooks, and class schedules to promote student success.

The department articulates with the University of Wyoming and the other community colleges annually, sending most, if not all, faculty to these meetings. Standardization of course curricula,

course numbering, placement cut-scores, and discussions involving transferability are topics of those meetings. In 2016, the annual meeting was planned by the mathematics faculty and hosted at EWC.

Not only does the department articulate with the University of Wyoming in order to best serve our students, but the faculty has participated in numerous professional development activities during the review period. Activities have included taking graduate classes, attending the Joint Mathematics Meeting between the MAA and AMS, completing Project ACCESS with the American Mathematical Association of Two-Year Colleges (AMATYC), participating in the national AMATYC conferences, attending distance learning conferences such as the Wyoming Innovations in Learning conference, participating in enrollment planning conferences such as the Ruffalo Noel Levitz Conference, and attending Summer institution such as the Summer Institute on Active Learning under Learning Actively Mentoring Program (LAMP), University of Wyoming. The information gained from these professional development activities help to create a faculty that is up to date and well-rounded.

With the implementation of the ADN nursing program on the Douglas campus, the number of students in mathematics courses on the campus has increased since the last review cycle. The full-time instructor teaches developmental and college level courses as well as Fundamentals of Statistics face to face, giving students on the Douglas campus the ability to take those classes in person.

Part III Recommendations

Faculty Recommendations: The math department has identified several areas they plan to focus on in the next few years:

- Study the data of the move to block classes for MATH 0903, 0920 and 0930 to determine if this was an effective way of increasing success and retention in the math sequence.
- Adopt the 2 + 2 agreement with the University of Wyoming.
- Investigate the transition of the Problem Solving class to one using a “co-requisite” model with MATH 0920 for those students testing into 0920.
- Due to the lack of credentialed, available adjunct instructors in Douglas to teach developmental courses, and the full workload of the full-time instructor on that campus, we recommend that the department research the possibility of piloting a “co-requisite” MATH 1400 class for Spring semesters, and combine the Fall Douglas Campus MATH 0920 and 0930 face-to-face and online into hybrid-delivered classes.
- Based on the growing demand of manpower in data science and a recent push from the state senate to add computer science to the basket of goods as a common core knowledge area, it may be a time for the college to think in the direction of adding some most-sought-after courses, if not full-fledged programs in data science or computer science, such as Introduction to Data Science, Computational Statistics, Introduction to Programming etc. On the other hand, it will also increase the enrollment in the sophomore level Math courses such as Calculus III and Linear Algebra. Math faculty also believes that this will help retain many students who aspire to go into the fields of technology.

- Continue to make reading a part of the math curriculum in emphasizing “story” problems and problem-based learning.
- Continue to develop courses that meet the needs of all students in our service area using alternative delivery methods, such as blended or hybrid deliver, as opposed to purely online courses. Classroom discussion and instruction are critical to the overall learning of math and our on-line offerings tend to have high numbers of students who are either under-prepared or not disciplined enough to take a math course on-line. Although we believe that the best setting for most students, especially most math courses, is in a face-to-face classroom, hybrid classes in which the students can either physically be in the class, or attend virtually while still maintaining an interactive, synchronous environment are recommended.
- Begin exploring the possibilities of adopting open educational resources (**OER**), which are textbooks and software resources that are “freely accessible, openly licensed text, media, and other digital assets that are useful for teaching, learning, and assessing...” (Wikipedia). Such resources would benefit students by reducing the high textbook costs without sacrificing the quality of the content and would standardize the book used for each course. OER benefits instructors by allowing them to create a textbook that contains only the content desired and would allow them to collaborate easier by using the same book for the same courses taught.
- Regarding concurrent courses, the department recommends that the VP of academics and/or the AVP of outreach should meet with concurrent instructors for training yearly in the fall. We feel that open, continued, and more frequent communication would be helpful in maintaining a high number of credit offerings, and that the EWC mathematics department should be actively involved in assessing the content taught and assessments used in concurrent classes to ensure that the courses are being taught with the rigor and consistency of those taught by the on-campus instructors.
- More recruitment of college-ready students so that upper level courses may be offered. Incentive for teaching upper level courses in math is low because they are generally low-enrolled and, therefore, the instructor may potentially receive reduced pay for these courses although s/he is preparing the course as if it had a full student load. Further, more college-ready students will provide the opportunity for a deeper pool of tutors in the CTL.
- It is our recommendation that as the math department faculty becomes more involved in professional development and organizations across the country, such as AMATYC and JMM, that the travel budget be increased substantially to accommodate faculty.

Division Chair Recommendations:

The EWC Math Department continues to provide a solid Math curriculum effectively meeting the needs of EWC students. The curriculum is broad and diverse, offering developmental level through advanced courses. Since the Fall Semester of 2015, students have had the opportunity to qualify for college-level math courses in fewer semesters saving time, money and resources as well as meeting the needs of the current Complete College Wyoming initiative. It also provides students a path to a college level class by their second semester, and because the courses

are in a block format, it decreases the total number of credits needed to complete the developmental level requirements. In order to assess the success of this format, an examination of student success data will be necessary.

Due to resignations, two new instructors have joined EWC within the past two years. Both have been positive additions and have provided both innovation and enhancement to the Department.

I recommend the following:

- 1) Continue to work effectively as a team and incorporate the strengths of the new instructors into the program offerings.
- 2) Continue to work with other departments on campus to meet the curricular needs of the various programs offered at EWC.
- 3) Gather and analyze data in order to monitor the changes in the developmental level courses and make changes and refinements if necessary.
- 4) Work with UW personnel to develop a Math 2+2 agreement in order to ensure EWC Math student transferability.
- 5) Continue to work with instructors at area high school and outreach sites to assure that high quality Math courses are offered both on-campus and concurrently.
- 6) Continue to attend articulation meetings throughout the state to assure that EWC offerings are consistent with those of other Wyoming colleges.
- 7) Consider offering courses in data science or computer science, such as Introduction to Data Science, Computational Statistics, Introduction to Programming etc. in order to help increase the enrollment in the sophomore level Math courses such as Calculus III and Linear Algebra, and help retain many students who aspire to go into the fields of technology.

Vice President's Recommendations: