

Golden West College

INSTRUCTIONAL PROGRAM REVIEW

Spring 2016

Program Name: Transfer level mathematics

Division Name: Math & Science

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|--------------|----------------|------------------------|-----------------------|
| None | | | |

PROGRAM INFORMATION

Assume the reader does not know anything about your program. Briefly describe your program and how your program supports one or more of [Golden West College's mission and goals](#). **This description will likely be used on your department's website.**

MISSION/VISION STATEMENT:

The Golden West College Mathematics Department seeks to promote a positive and effective learning environment to maximize opportunities for student success. We are committed to improving the mathematical skills, critical thinking skills, and problem solving skills of our students regardless of their diverse background or skill level. The department integrates the use of technology and online resources to offer transfer courses consisting of:

- Math G100: Liberal Arts Mathematics,
- Math G104: Math for Elementary Teachers,
- Math G115: College Algebra,
- Math G120: Trigonometry,

Math G140: Business Calculus,
Math G160: Introduction to Statistics,
Math G170: Pre-Calculus,
Math G180: Calculus 1,
Math G185: Calculus 2,
Math G235: Applied Linear Algebra,
Math G280: Calculus 3,
Math G282: Ordinary Differential Equations, and
Math G285: Introduction to Linear Algebra and Ordinary Differential Equations.

These courses meet the needs of students who plan to transfer to four-year colleges and universities, and satisfy general education requirements as well as lower-division major coursework in science, technology, engineering, mathematics, nursing, business, psychology and other social sciences. The department looks forward to the future and all that it holds for the improvement in the learning of Mathematics.

College's mission (check all that apply)

- Basic Skills**
- Career Technical Education**
- Transfer**
- Offer Degrees/Certificates**

Program Contributions: Describe how your department contributes to the campus. Consider areas such as diversity, campus climate, student success, campus processes, student support, and other college goals below.

In addition to the GWC Associate of Arts degree in Mathematics, the department has an approved transfer model curriculum leading to an Associate of Science for Transfer degree in Mathematics and an Associate of Arts degree in Liberal Arts with an emphasis in Mathematics. From 2012 to 2015, 116 degrees were awarded to students majoring in mathematics.

A total of 37 programs require at least one transfer level mathematics course. This number includes 21 Associate Degree for Transfer (ADT), 12 Associate of Arts Degrees (AA) and 4 certificate programs. Several degrees require multiple transfer level mathematics courses. With new transfer degrees being developed, the demand for transfer-level mathematics courses will continue to increase.

The department annually awards several departmental scholarships to students planning to continue their education in a STEM field. In addition, we continue to participate in the annual mathematics competition through the American Mathematical Association of Two Year Colleges (AMATYC) and the top three students are given an award and advance to the next level of the competition. The highest scoring GWC student is recognized with their name placed on the winner's plaque outside the math lab. In 2015, the department participated in the annual Science Showtime event held on the GWC campus to promote STEM education and career opportunities

for the community. The event was a great success and the department plans to continue in this annual event broadening its scope and activities each year.

The 3 full-time faculty in the department are stretched thin in terms of representation on several college-wide committees and initiatives. Relevant issues are regularly discussed at each department meeting including the review, assessment, and discussion of Student Learning Outcomes (SLOs) for all mathematics courses and programs. There continues to be communication and collaboration with the full-time remedial math faculty (LRC-Remedial Math) as they attend our regular department meetings and share information about their efforts and effectiveness of the remedial math program. However, the department has not been as involved in the oversight or coordination of the remedial math program activities since 2014-2015. Consequently, this PR mainly focuses on the transfer level math program.

College goals(check all that apply):

- Institutional Mission & Effectiveness
- Instructional Programs
- Student Support Services
- Library and Learning Support Services
- Student Engagement
- Student Equity
- Human Resources
- Facilities & Campus Environment
- Technology
- Fiscal Resources
- Planning Processes
- District Collaboration
- Community Relations
- Business, Industry, Governmental Partnerships

External Requirements: Indicate any requirements that are imposed on your program by the state, federal regulations, or other external accrediting bodies (if applicable).

REVIEW OF LAST CYCLE PROGRAM REVIEW

Provide assessment of your previous program review initiatives. Summarize any accomplishments that your program achieved. (2 pg limit)

During this PR period, the department continued to improve in its review, assessment, and discussion of SLOs for program improvements. Course coordinators further collaborated with our part-time faculty in regards to SLOs, posting of syllabi, and other course-related matters. Due to various circumstances, the number of full-time faculty decreased from 7 in 2013 to 3 in Spring 2016 which lead to an increase in the number of part-time faculty (23 in Spring 2016) and a bigger challenge for the remaining 3 full-time faculty to mentor and collaborate with them.

In 2014, Golden West College President Wes Bryan recommended an extensive review of the mathematics program be completed to address concerns over low student completion, barriers to

student success, and persistence toward the next math level. Through the Program Vitality Review process, a committee was formed to evaluate the remedial (developmental) / basic skills mathematics coursework, and in a second phase, transfer level mathematics. The focus on both PVR processes is the success of the students as defined by satisfactory completion of a course. Upon completion of the Remedial Math PVR 1.0, the College President reorganized the math department by separating the remedial math program (consisting of Math G010: Elementary Algebra and Math G030: Intermediate Algebra) and relocating the program to a new College Readiness in the Learning Resources Center (LRC) under the supervision of then interim-Dean Alex Miranda. The relocation of the developmental math program allowed for alignment with local high schools to better prepare students entering the college, explore pre-assessment preparation workshops and math refresher programs, and experiment with class size variations and teaching options. The transfer-level math program continued under the supervision of Dean Jeff Courchaine in the Math-Science Division.

In spring 2016, the Transfer Math PVR 2.0 committee completed its review of the transfer level math program. An extensive review of data, research articles, and discussions took place to determine recommendations for program improvement and they were presented to the College Vice President. The report indicates a significant increase in the demand and enrollment in Math G160 (Statistics) as well as a few other transfer-level math courses. Many of these course sections were added to the schedule and continue to be offered as large class factor (LCF = 55 or more students) but with inadequate student and instructional support. The report also indicates low success rates for the STEM pathway and Calculus course sequence. These trends are very alarming to the department since these courses are core courses for the mathematics ADT and AA degree and they are now mostly taught by part-time faculty with limited availability to meet with students outside of class time. The math department continues to struggle in hiring and retaining experienced faculty to implement alternative and effective teaching models and workshops. However, we feel confident that the recommendations of PVR 2.0 will help the department grow and increase the student success and completion rates in our programs. Some recommendations are currently being planned for implementation beginning in Fall 2016.

In addition to serving on several college committees, the full-time faculty have submitted changes to some course outlines bringing them to be in better alignment with the C-ID descriptors and to courses offered at our surrounding colleges and universities. They further participated in discussions related to the Math Placement Test Task Force which completed its task in spring 2016 and submitted recommendations for improvement in the math placement policies and to get ready for the CCC Common Assessment implementation. The math faculty continue to be committed to communication, collaboration, and cooperation in growing our department and improving our programs on all levels.

FOR CTE PROGRAMS ONLY

Labor Market Demand: How is your program meeting labor market demands? Should you expand, contract or stay the same? Is there competition from other programs in the area? If yes, from what institution? How is the competition affecting your program? Are there any other external factors about which you are concerned?

Click here to enter text.

VTEA Core Indicators: When reviewing the state VTEA core indicators, what are the trends that contribute to or impede student success? Why is this occurring?

Click here to enter text.

Advisory Council Input: What type of inputs have your program received from your industry advisory council in the last three years?

Click here to enter text.

SWOT ANALYSIS

Strengths:

- What does your program do well?
- What do you believe your students, potential employers, or transfer institutions see as your program's strengths?

The Mathematics Department offers a range of courses designed to prepare students for STEM and non-STEM majors. We are proud that our courses are taught with the appropriate rigor and prepare transfer students for success at their target institution. Since 2010-2011, each of the transfer-level courses has seen major growth in demand. This has led to an increase in the number of transfer-level courses offered with double the number of sections of each course offered by 2015-2016. In particular, Statistics (Math G160) has seen the greatest enrollment increase, and the number of sections offered has increased from 4 sections in 2010-2011 to 12 sections in 2015-2016. Statistics has also consistently been offered during both winter and summer sessions. The department is also significantly contributing to the College's goal of reaching its FTES target by doubling the number of transfer level math sections offered in Summer 2016.

While the department believes that large class sizes are an impediment to success, we continue to find effective ways to reduce the negative impact of the large class sizes in gateway courses such as Math G160 (Statistics) and Math G115 (College Algebra). Instructors utilize an online course management system, MyMathLab, which provides students with a variety of resources to help them master the course content. The faculty continue to attend conferences and workshops to implement new trends in technology and teaching models.

The department does a great job with the annual AMATYC math contest and ranks high among the Orange County Community Colleges each year. The Mathematics Department believes this success is attributable to the excellent teaching our faculty provides in Math G180, Math G185, Math G280, Math G235, and Math G285. In addition, the department has a great scholarship program. Each year the ReyCarr Scholarship provides about \$1000 for our outstanding students and has been set up to continue this into perpetuity.

Weaknesses:

- In what areas does your program need to improve?
- What are your program's immediate needs?
- What limitations or barriers is your program experiencing?

The Mathematics Department continues to face the same challenges from the past program review period. More specifically, the program is in need of at least six additional full-time tenure-track faculty to teach and coordinate our transfer-level courses. The number of full-time faculty in the department has decreased from 7 in fall 2013 to just 3 in spring 2016. As such, our program has limitations in growing and achieving more consistent outcomes. We are also stretched thin in terms of serving on campus committees and initiatives.

All offered sections of Statistics (Math G160), Liberal Arts Math (Math G100), and College Algebra (Math G115) are scheduled as Large Class Factor (LCF) consisting of 72 or more students per section while the other math courses are kept at class sizes of 36. The large class sizes in these gateway courses make it difficult to engage students and provide individualized attention. Consistent and innovative teaching models are also more difficult to implement due to lack of adequate training and professional development.

The increase in the number of transfer math sections has forced the department in increasing its utilization of part-time faculty, who have teaching assignments at several other colleges and are not available for office hours due to their stretched workload. Each full-time faculty has taken on the responsibilities of being a course coordinator for multiple courses and uses this process to communicate with the part-time faculty on a variety of topics including teaching to the course outline of record, adhering to campus processes, and coordinating SLO data from each of their respective courses. Continued discussions about SLO data and other course matters take place at the department meetings throughout each semester. Although part-time faculty have the option to attend the meetings, they never do, arguing their limited availability outside of their teaching assignment makes attendance challenging.

Our department continues in its efforts to address the success and retention rates of students in transfer-level mathematics courses. We face the problem of many underprepared first-year students who come to us with poor study and math skills. They especially suffer from deficiencies in their knowledge of both algebra and trigonometry. There is ongoing discussion in our department regarding programs, workshops, activities, and pedagogical approaches aimed to improve the success of transfer-level math students.

Opportunities

- What opportunities exist for your program?
- What trends are happening in the field or subject area that may allow your program to expand?
- What external funding opportunities are available for your program?
- What potential industry, high school, college/university or other external partnerships can be established or expanded to benefit your program?

The Golden West College Transfer Mathematics program maintains strong student demand and is a requirement in a number of college degrees and certificates. A total of 37 programs require at least one transfer level mathematics course. Several degrees require multiple transfer level mathematics courses. With new transfer degrees being developed (7 additional subject areas available), the demand for transfer-level mathematics courses will continue to increase. We see this as an opportunity to develop and implement new course curriculum and workshops to better address the needs of students in these new programs. In addition, we will begin discussions and investigation into using OER content and books for courses where appropriate materials can be found.

Receiving a HSI-STEM Grant will provide opportunities to partner with various organizations (high schools, universities, and business/ industry) to recruit and support Hispanic/Latino students through their STEM courses and education plans at GWC. We plan to use this resource to implement innovative teaching strategies using technology and share resources to bridge the completion gap of students for all ethnic groups. Furthermore, we are excited to be involved and look forward to the construction of the new Math-Science building with a large STEM Center that will put GWC STEM on the map. We will continue to be involved in the annual Science Showtime and develop Summer STEM Institutes for our local community.

In the next few years, we will also have an opportunity to be involved in the implementation of the CCC Common Assessment for placement. This initiative will impact all students who plan to enroll at GWC and the work to be done for a successful implementation and continued improvement is an opportunity we look forward to.

Threats/Challenges

- What challenges exist for your program?
- What budgetary constraints is your program facing?
- What kind of competitive disadvantages is your program facing?
- Are there upcoming changes to state and federal regulations that will impact your program? If so, please explain.

The biggest challenge within our program is the shortage of full-time faculty needed to teach transfer-level courses and to mentor and evaluate our new part-time faculty. The number of full-time faculty to support a transfer-level math program has declined dramatically and can no longer support the level of coursework necessary to build a strong transfer program. The number of full-time faculty in the department has decreased from 7 in fall 2013 to just 3 in spring 2016. Also during this period, several of the department's stronger part-time faculty left, as they were hired for full-time positions at our neighboring colleges. These reductions in faculty left the department needing to hire new part-time instructors, some with little or no teaching experience at the community college level. As such, over 75% of the transfer-level math courses are now taught by part-time faculty. This is of serious concern for our program since students have little to no access to part-time faculty for out-of-class office hours.

There's also the challenge of not having adequate and sustainable tutoring/mentoring program and/or Supplemental Instruction or Learning Communities models for STEM students and so

they opt to enroll at one of our sister colleges where more options and access to faculty and support services are provided.

Changes to state and federal regulations typically have an impact on subjects like mathematics at all levels. The impact of the Common Core Standards and how well those students who were held to those standards are college ready remains to be seen. Furthermore, State initiatives such as SSSP, Equity, and Common Assessment, all have tremendous implications on mathematics programs. We will continue to monitor and implement initiatives that meet these standards and regulations as appropriate.

CURRICULUM REVIEW

Course Outlines of Record: It is expected that all Course Outlines of Record (CORs) will be reviewed every three years. Starting in summer 2016, courses featured in the College Catalog will directly link to the courses' official CORs. It is crucial for all CORs to be reviewed to ensure their accuracy. Upon reviewing the courses in your disciplines through [CurricUNET](#), please provide a 3 year timeline of when all of the CORs under your disciplines will be reviewed. Please follow the table format below.

| CORs needing review/ revision | Timeline to complete review | Person responsible |
|--|--|---------------------------|
| Math G100 | May 2017 | Lindsay Lewis |
| Math G104 | May 2017 | Lindsay Lewis |
| Math G115 | May 2017 | Lindsay Lewis |
| Math G120 | May 2017 | New FT Faculty |
| Math G170 | May 2017 | New FT Faculty |
| Math G010 | May 2018 | Maryam Khakbazan |
| Math G030 | May 2018 | Gita Alemansour |
| Math G140 | May 2018 | Pete Bouzar |
| Math G160 | May 2018 | Pete Bouzar |
| Math G180 | May 2019 | Antony Hoang |
| Math G185 | May 2019 | Antony Hoang |
| Math G235 | May 2019 | Pete Bouzar |
| Math G280 | May 2019 | Antony Hoang |
| Math G285 | May 2019 | Pete Bouzar |

C-ID Designation: In 2006, the Academic Senate for California Community Colleges developed the [Course Identification Numbering System \(C-ID\)](#). This system improves curricular consistency for courses throughout the state and provides many articulation/transfer benefits to our students. Many courses at Golden West College have been approved for C-ID alignment. Please review the list provided by Office of Research, Planning, and Institutional Effectiveness and discuss the following:

1. Does your department plan to submit more courses for C-ID designation? If yes, which ones? (These courses may or may not be part of an ADT. See C-ID.net for more information regarding courses, descriptors, and ADTs.)

The department plans to review and verify consistency with the C-ID descriptors for all courses that are not yet approved for C-ID alignment. This list consists of Math G100, Math G104, Math G115, Math G120, and Math G170. It is the department's goal to submit several of these courses for C-ID designation prior to the next program review.

Dual-listed courses: Review the list of dual listed courses in your area and complete the following chart.

| Dual Listed Courses | Date of Faculty Discussion and Review | Recommendations |
|---------------------|---------------------------------------|-----------------|
| (None) | NA | NA |
| | | |
| | | |
| | | |

Curriculum Offering: Review the list of active courses in your programs that were offered and not offered in the last three years. Based on your review, what courses could you add, suspend, or retire to improve your overall program to ensure student success? (Data provided by ORPIE)

The department plans to review the viability of offering courses that are currently in suspension or retire them as appropriate. In addition, we will begin curriculum development for a Pre-Statistics course (Math G080) for students that are on a non-STEM transfer pathway and a Business Statistics course (Math G165) for business majors.

| Course Name | Recommended Action (add/suspend/retire) |
|---------------------------------|--|
| Math G005 | TBD (remain suspended pending viability review) |
| Math G008 | TBD (remain suspended pending viability review) |
| Math G103 | TBD (remain suspended pending viability review) |
| Math G155 | TBD (remain suspended pending viability review) |
| Math G282 | TBD (possibly suspend pending viability review) |
| Math G080 (Pre-Statistics) | ADD (once CCI approved, begin to offer in Spring 2017) |
| Math G165 (Business Statistics) | ADD (once CCI approved, begin to offer in Fall 2017) |

PROGRAM DATA AND ANALYSIS (Items in black font are provided by ORPIE)

SLO Assessments

List of courses with ongoing assessment:

All transfer level math courses have an ongoing SLO assessment cycle. The following cSLOs have not been assessed and we plan to complete the cycle for these courses in 2016-2017.

- Math G115- cSLO 1
- Math G120- cSLO 1
- Math G140- cSLO 1
- Math G280- cSLO 4

List of courses offered in the last 3 years that have not been assessed

- (None)

Question:

- **Looking at all assessments of your programs and courses, describe proposed plans for improvement.**
 - Some proposed plans for improvement in student performance on course SLOs include instructor goals to incorporate more group-related work in the classroom environment, prepare worksheets for in-class remediation of topics, emphasize test taking practices to help students overcome test anxiety, include more contextualized applications of interest, and participate in professional development.
 - Current department practices include collaboration in syllabus development amongst full- and part-time faculty and sharing of assignments and teaching methodologies. These practices will continue and be evaluated for improvement via feedback from the part-time faculty.
 - The department plans to promote continued and consistent professional development opportunities for all math faculty to gain mastery in teaching methodologies. We aim to increase in-class student-faculty contact via alternative teaching and learning strategies.
 - The department will assess the remaining course SLOs for Math G115, Math G120, Math G140, and Math G280 during Fall 2016.
 - The department faculty will develop curriculum for a Pre-Statistics course (Math G080) for students who are moving on to Statistics (Math G160) or a non-STEM degree path. Pending CCI approval, we plan to offer this course in Spring 2017. In addition, faculty will be encouraged to develop curriculum for a course in Business Statistics and other courses as appropriate.

Student Demographics (Headcount by Discipline)

- *Gender:* From 2012-2013 to current, the number of female students in transfer level math sections has increased by approximately 0.5% (From 1,360 to 1,367), while the number of male students in transfer level math sections has increased by approximately 6.9% (From 1482 to 1,584). During this time, transfer level math courses have steadily consisted of a majority of male students (ranging from 4.2 – 8.2% more males than females throughout this three-year interval).
- *Age:* Since 2012-2013 enrollment in transfer level math courses has been consistently dominated by students age 20-24, and secondly dominated by those ages 19 or less. However, during this interval, the relative frequency of students in the 20-24 age range has increased by 2.8% while the ratio of the enrollment of those in the age 19 or less category has decreased by approximately 2.5%
- *Ethnicity:* Since 2012-2013, enrollment rates for the ethnic groups Asian, African American, Hispanic/Latino, and White have increased. The data show the most significant increase to be among the Hispanic/Latino students who went from enrollment of 662 students in 2012-2013 to 769 in 2014-2015 (an increase of approximately 16.2%. Meanwhile, though Asian enrollments in transfer level math courses increased from 2012-2013 to 2013-2014, they then declined to a four-year low in the 2014-2015 academic year.
- *Disability:* The percentage of students registered in transfer level math with a disability increased from 2.6- 3.1% between the 2012-2013 academic year and the 2013-2014 year. This proportion then decreased slightly to 2.9% in 2014-2015. Thus, there has been an overall increase in the percentage of students with a disability taking transfer level math courses.
- *Economic Disadvantage:* The quantity of students categorized as economically disadvantaged has been on a continued rise over the past six years. Specifically in the past three years (this PR interval), the number of economically disadvantaged students enrolled in transfer level math rose from 1,662 (58.0% of transfer level math students) in 2012-2013 to 1,824 (61.4% of transfer level math students) in 2014-2015.
- *Veteran:* Enrollment of veteran students in transfer level math has stayed stable with a maximum fluctuation of 0.3% (a decrease by 9 students from 2013-2014 to 2014-2015).
- *Foster Youth:* Enrollment of foster youth students has stayed stable with a maximum fluctuation of 0.4% (a decrease of 16 students from 2013-2014 to 2014-2015).

Comparison to GWC

Questions:

- **How does your student population compare to GWC's general student population?**

Consistent with the College, the largest student populations consist of White, Asian, or Hispanic/Latino students. The 5-year trend shows the proportion of Hispanic/Latino students has increased to 30.0% for GWC and 25.9% for transfer-level math in 2014-2015. In addition, 28.0% of transfer level math students are White and 38.5% are Asian. The African American population for both College and transfer level math are very low, 2.4% for GWC and 1.1% in transfer level math in 2014-2015.

- **Based on the trend that you're seeing, what type of adjustments would you make to your program?**

Outreach efforts to promote STEM education paths for Hispanic/Latino students and other minority groups are very important to our department. The math faculty are actively involved in the planning and development of activities to be held in the STEM Center. We will continue our involvement in the annual Science Showtime and brainstorm ideas about a Summer STEM program for students and community members. We plan to partner with our science colleagues to develop and provide resources for these students to persist and succeed through our programs.

We look forward to the construction of the new Math-Science building which will have a much larger STEM Center that will serve our students and provide a welcoming and innovative learning spaces. We will use available resources and seek STEM Grants to develop activities and workshops to attract and support Hispanic/Latino and all students towards completion of STEM career pathways at GWC.

Program Enrollment (Filter by: Discipline, Session Type, Large Lecture Factor)

- *Enrollment at Census:* The data indicate that total enrollments have been increasing during the past 3 years, however, the enrollment per section and average fill rates have decreased over this time period.
- *Sections Offered (by CRN):* Since 2012-2013, the number of transfer math sections offered has increased by approximately 30% (from 130 to 170) per academic year.
- *Fill Rate at Census:* Despite the decrease in average fill rate over the past 3 years, the average fill rate has consistently been between 98.5% and 103.7% for transfer math.
- *FTEs/FTEF:* Since 2012, this ratio for transfer math has decreased by 14.9 (from 63.8 to 48.9) as compared to a decrease of 6 (from 41.8 to 35.8) for the College.

Questions:

Consider sections offered, session type, and your current PT faculty pool as part of your analysis.

- What factors have contributed to your trends in enrollment, sections offered, and fill rate?

The decline in fill rates is consistent with enrollment trends across the State and other local colleges. Separate from external factors beyond our control, factors contributing to these trends at GWC include the rapid increase in the number of transfer math sections (approximately 30% since 2012-2013) added to the college schedule, especially for Math G160 and a few other transfer math courses giving students more options for their schedules. Other factors that contribute to these trends may include the large class sizes; inadequate access to part-time instructors during non-class times; classrooms and facilities that are not welcoming for effective student engagement and learning; and ineffective transfer math/statistics tutoring or supplemental instruction program.

- Based on your review of the data, should you increase, decrease, or keep the same number of sections offered?

According to the data and current department resources, it is recommended that we maintain our current schedule capacity at this time but pilot some sections using alternative scheduling patterns and teaching models to determine effectiveness. As new courses are approved, begin to offer and adjust all course scheduling patterns for greater accessibility and efficiency.

- How does your department average FTES/FTEF compare to college-wide average FTES/FTEF?

Since 2012, the percentage of courses taught by full-time faculty compared to part-time faculty has decreased from 61% to 42% in the fall semester and from 57% to 43% in spring semester. In spring 2016, about 75% of the transfer math sections were taught by part-time faculty. This drastic decrease is due to the loss of 3 full-time faculty in 2015-2016. Since 2012-2013, the FTES/FTEF ratio for transfer math decreased from 63.8 to 48.9, a 23.4% decrease while the college only saw a 14.4% decrease (41.8 to 35.8).

Course Retention and Success

Overall: Since 2012-2013, overall retention rate decreased from 78.3% to 77.8% while the overall success rate decreased from 60.6% to 56.7%.

By Ethnicity, Age, Gender:

- Since 2012-2013, there has been no significant change in the retention rates of any ethnic group. However, in spring 2014-2015, African Americans had the lowest retention rate of 62.5% compared to the other groups and the total for that term.
- The 3-year success trends for all ethnic groups (Asian, African American, Hispanic, and White) have decreased. The data indicate the largest decrease to be among the Asian students who went from 65.8% to 56.4% in the fall and from 67.5% to 60.4% in the spring. African American students spring success rates decreased from 52.1% in 2012 to 31.3% in 2015. Hispanic/Latino success rates were 55.9% in fall 2015 and 50.3% in spring 2015. In contrast, summer success rates show an increase in success rates for Asian, Hispanic/Latino, and White ethnic groups. There may be many factors that contribute to this which may include students taking lighter course loads and

adapting to a more condensed time frame to complete the course. In addition, many summer students take our courses while on break from attending a university and/or are repeating a course and so they are more familiar with the course content making it more likely to succeed over the summer.

- In terms of gaps in success rates, the data again indicate the Hispanic population as having the largest successful completions lost (32 students) for the 2014-2015 academic year followed by “Two or more” (11 students) and African Americans (4 students).
- While the overall retention rates for economically disadvantaged students, veterans, students with a disability, and foster youth have stayed stable, their overall success rates have decreased. The largest decline can be seen for veterans who went from 64.4% in 2012-2013 to 52.9% in 2014-2015.
- Female students generally have higher retention and success rates than males for all semesters. Female student success rates are around 60.0% while males are around 53.7%. Both groups have higher success rates during the summer, females at 66.5% and males at 63.1% in 2014-2015.
- Students under the age of 29 make up about 94% of the students in our program. The success and retention rates for this age group have not significantly changed since 2012-2013.

By Large Lecture: Innovative teaching strategies and individualized learning models are more challenging to implement and sustain in large lecture courses, especially in College Algebra and Statistics. Since 2012-2013, the success and retention rates for LCF sections of transfer level math have stayed relatively stable around 60.0% and 80.0%, respectively. In contrast, the small lecture courses have seen a slight decrease in both success and retention. From 2012 to 2015, the retention decreased from 77.7% to 73.3% and the success rate decreased from 61.5% to 53.5%. Consistent with the PVR 2.0 report, these single-size sections consist mainly of STEM pathway courses such as Trigonometry, Precalculus, Calculus 1, 2, and 3, and higher level math courses. The departure of 4 full-time faculty who regularly taught these courses is a factor in the decreasing trend observed in the data.

By Session Type (Day, Evening, Hybrid, Online): Although the success rates for day and evening classes have been decreasing since 2012-2013, the evening classes consistently have slightly higher success and retention rates than the day classes..

The department does not offer any hybrid or online courses but plans to investigate the feasibility of offering them in the future.

Questions:

- Looking at success rates for different demographic groups (age, gender, ethnicity), which groups are experiencing disproportionate impact (success rates for those groups are lower than the average success rates) in student success?

The data appear to indicate there's a disproportionate impact for African American, Hispanic/Latino, and "Two or more" ethnic groups. In terms of gaps in success rates, the data again indicate the Hispanic/Latino population as having the largest successful completions lost (32 students) for the 2014-2015 academic year followed by "Two or more" (11 students) and African Americans (4 students). The semester-to-semester variability in success and retention rates for African Americans appears to be greater than any other ethnic group; however, they only consist of at most 22 students for any academic year.

- **If there are student groups experiencing disproportionate impact, what's your department's plan to address the disproportionate impact?**

Through training and collaboration with our part-time faculty, we will continue to use our LMS systems (MyMathLab, BlackBoard/Canvas, Civitas) to identify at-risk students and reach out to them with "just-in-time" remediation or refer them to other campus resources. The department would like to continue collection of data through student surveys about what challenges they face when they enroll or decide to drop a math course. More personalized study plans and workshops will be developed to help address their academic challenges.

The department will continue discussions in regards to receiving an HSI-STEM Grant and partnerships with organizations that encourage Hispanic/Latino and other minority groups to pursue STEM education and career paths. We will seek ways to establish a sustainable and effective Supplemental Instruction (SI) program and/or Learning Communities that will bridge the gap in success and retention rates for all ethnic groups.

Faculty Staffing

Percentage of courses taught by full-time versus part-time faculty

- **In recent years, what successes/challenges have you had in hiring and retaining qualified part-time faculty?**

The number of full-time faculty to support a transfer-level math program has declined dramatically, and can no longer support the level of coursework necessary to build a strong transfer program. The number of full-time, tenured faculty in the department has decreased from 7 in fall 2013 to just 3 in spring 2016. Since the 2012-13 academic year, the percentage of math sections taught by full-time faculty have dropped from 58% to 34%. In contrast, the percentage of all GWC sections taught by full-time faculty dropped from 56% to 51%. Also during this period, several of the department's stronger part-time faculty left, as they were hired for full-time positions at our neighboring colleges. These reductions in faculty left the department needing to hire new part-time instructors, some with little or no teaching experience at the community college level. As such, over 75% of the transfer-level math courses are now taught by part-time faculty.

- **Based on your department discussion, what do you see as your ideal number of full-time faculty to promote student success?**

The ideal number of full-time faculty to promote student success is at least 10. The Math department needs 2 full-time faculty to coordinate Statistics (Math G160) courses, 3 full-time faculty to coordinate Calculus sequence courses (Math G140, Math G180, Math G185, Math G280), 1 full-time faculty to coordinate 200-level courses (Math G235, Math G282, Math G285), 3 full-time faculty to coordinate Trigonometry (Math G120), College Algebra (Math G115), and Pre-Calculus (Math G170), and 1 full-time faculty to coordinate other math courses (Math G100, Math G104).

Degrees and Certificates

Number of degrees and certificates conferred in the last 6 years

Completers are defined

- In the last 6 years, 216 math degrees were awarded.

Questions:

- **Based on the number of degrees/certificates you are awarding, discuss any differences between your expectations and actual numbers.**

The Math Department desires a higher number of degrees awarded. However, the lack of full-time faculty available to teach expanded course offerings is a hindrance to expanding any curricular offerings in mathematics at GWC. Higher level mathematics courses (beyond Math G280: Calculus 3) for STEM programs have not been consistently offered at Golden West College each semester. When available, these courses have lower enrollment than other courses (such as Calculus 1 and 2). Students accustomed to the lack of higher level course offerings have been taking these classes at neighboring colleges, including Orange Coast College. This has a negative impact on a student's pathway through the coursework, degree completion at GWC. In addition, IGETC and CSU-GE Breadth students are often undecided, yet have a goal of transferring to a four-year college/university. These numbers may shift as students declare a formal discipline major, or transfer without completing an Associate Degree at Golden West College.

- **Please answer this question for programs that have fewer than 10 completers in the last 6 years: What strategies will you implement within your department to increase/attract completers or majors?**

PROGRAM PLANNING

Based on your analysis of previous program review and current data:

- **What does your program want to accomplish in the next three years?**
 1. Additional full-time tenure-track faculty will need to be hired to allow for coordination of coursework and participate in campus initiatives. Hire 2 Full-Time faculty immediately for Fall 2016 and within the next five years, fill 1 or 2 full-time faculty vacancy members each year for a total of 10 Full-Time faculty by Fall 2020.
 2. Continue to refine our curriculum and develop new ones
 - i) Review and revise all CORs for better alignment with C-ID descriptors,
 - ii) Review and revise all course and program SLOs,
 - iii) Develop new courses and workshops.

3. Establish departmental final exams with grading rubrics for all transfer math courses and analyze their effectiveness in assessing course competencies.
4. Participate in the implementation of the Common Assessment Test for math and set appropriate course placement and multiple measures criteria.
5. Increase faculty development and implementation of alternative course schedules and teaching modalities (Hybrid, Web Enhanced, Flipped, etc.) for selected sections.
6. Increase on-campus student access to all math faculty and STEM-specific support services. Be more active in establishing the STEM Center as a valuable resource center for STEM tutoring, study groups, and workshops.

- **What areas does your program plan to improve?**

1. Hire and mentor transfer math faculty to help our program grow as needed.
2. Reduce class size on large-class factor courses when feasible and integrate alternative teaching modalities for greater in-class student engagement and personalized learning.
3. Monitor relevant data and establish better coordination of course and program objectives with part-time faculty for greater consistency and effectiveness.
4. Monitor math placement data and student's progress towards completion of transfer level math courses.
5. Seek professional development and integrate best practices in college-level mathematics education and share strategies with faculty and students.
6. Continue discussion and collaboration with colleagues in the STEM disciplines to address the needs of students struggling with their math skills and develop STEM success resources.

- **What specific actions will you take to improve upon those areas?**

1. New faculty will be mentored and assigned duties as course coordinators
 - i) Course coordinators will submit revised CORs for Math G100, G104, G115, G120, and G170 for CCI and C-ID approval,
 - ii) Update any course and program SLOs as necessary,
 - iii) Submit for approval a Pre-Statistics course in Fall 2016.
2. Faculty will work on the implementation team and coordinate the validation of the common assessment test to establish course placement and multiple measures criteria.
3. Full time faculty will start development of common exams and rubrics in the Fall 2016 term and continue refinement of examinations for Fall 2017 implementation.
4. Seek faculty development opportunities and pilot sections using active learning models and technology.
5. Develop topic-specific workshops/activities and integrate technology and contextualized learning models using the STEM Center. Encourage faculty, especially part-time faculty, to hold some office hours in the STEM Center and share their expertise in developing STEM related activities.

- **How will you assess whether your program has accomplished those goals?**

1. The full-time faculty in transfer math will assess our accomplishments through
 - i) Submitted CORs that are approved and receive a C-ID designation,
 - ii) Continue using SLOs and other data to determine course and program effectiveness,
 - iii) Begin to offer Pre-Statistics in Spring 2017.

2. Continue to use data to discuss and improve the placement of students in math courses. Track their success and persistence through completion of the program requirements.
3. The common final exam results will be used to discuss course and program improvements with all math faculty.
4. Establish a department SharePoint portal and begin sharing of resources and strategies that prove to be effective with students and faculty.
5. Survey and feedback received from students participating in workshops and STEM-related activities will be used to assess their effectiveness and expand the scope of the services offered.

RESOURCE ALLOCATION

In order to accomplish those goals, what resources do you need? You will need to fill out the resource request forms and include them with your Program Review Report.

- *Staffing:*
 - request for 3 additional full-time transfer math faculty
- *Facilities:*
 - request for more welcoming classrooms and study spaces in and around the Math/Science building
 - Spot clean carpet, tables, and instructor work stations in select classrooms
 - Repair and paint of damaged hallways and walls in and around math/science building
 - Remove from classrooms unnecessary equipment, chairs, oversized screens, and items that don't belong
 - New landscaping in front of the STEM Center
- *Technology:*
 - request for class set of graphing calculators
 - request for teacher tool kits including various sensors and software
 - request for better and reliable Wi-Fi access for more students in and around the Math/Science building
- *Equipment:*
 - New student chairs in select math rooms
- *Funding for Professional Development:*
 - request funding for part-time faculty stipends and faculty development for integration of active learning models and use of technology in select transfer level math courses

Signatures, Individual Comments

Department Chair and Dean Review

Complete this section after reviewing all program review information provided. The Department Chair and Dean are to separately indicate the level of concern for the program that exists regarding the following Program Vitality Review (PVR) criteria. Add comments for any item marked with a 1 or 2. Identify whether the comment is made by the IUA or the Dean.

(Scale: 0 – No concern at all, 1 – Some concern, 2 – Serious Concern)

Chair/Dean

- (0) (0) a. Significant declines in enrollment and/or FTES over multiple years
- (2) (2) b. Significant change in facility and/or availability and cost of required or necessary equipment
- (2) (2) c. Scarcity of qualified faculty
- (0) (0) d. Incongruence of program with college mission and goals, state mandates, etc
- (0) (0) e. Significant decline in labor market
- (0) (0) f. Continued inability to make load for full-time faculty in the program
- (0) (0) g. An over-saturation of similar programs in the district and/or region
- (2) (1) h. Other: Faculty Development

Program Review Check-list

- ✓ Department Contact Information is up to date: Department Chairs, full-time faculty, classified.
- ✓ Organization Chart: Verify that it is up to date: (q:\college information\org charts) Report necessary changes to the Director of Personnel
- ✓ Both the Dean and Department Chair have completed the Dean and Department Chair Review section.

Signatures, Individual Comments

Date of Department Discussions: **3/28/16 – 4/8/16**

Discussion Modality

- Department Meeting
- Emails
- Online/Skype
- Other

Summary of Discussion Outcome:

This PR was written collaboratively by the 3 full-time transfer level math faculty through discussions that took place via emails and at a department meeting. The department plans to begin work on accomplishing our goals as identified in this report. We look forward to developing curriculum and implementing activities that meet the learning needs of our students and growing our program as part of GWC STEM.

Departmental Recommendation

(X) No further review necessary

() We recommend this program for Program Vitality Review

I have read the preceding report and accept the conclusions as an accurate portrayal of the current status of the program. Signatures are on file in the division office. Type the names of the faculty.

- Pete Bouzar
- Antony Hoang
- Lindsay Lewis

I have read the preceding report and wish to add signed comments to the appendices. Signatures are on file in the division office.

- ()
- ()
- ()