



Mathematics Instructional Program Review 2011-2012

Spring 2012

Prepared by
James McClain, Dean of Mathematics

Mathematics Program Review Committee Members

Name	Title	Name	Title
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Casey, David	Faculty	Scott, Chris	Faculty
Everest, Robert	Faculty	Swan, Alfie	Faculty
Gong, Cathy	Faculty	Swatzel, Paul	Faculty
Gonzalez, Rudy	Faculty	Tippins, Ralph	Faculty
Gutierrez, Jesus	Faculty	Trad, Mohamad	Faculty
Low, Joyce	Faculty	Tussy, Alan	Faculty
Medrano, Esmeralda	Faculty	White, Sheila	Faculty
Nguyenhuu, Rick	Faculty	Zhuang, Eagle	Faculty
Odrich, Steve	Faculty		



PROGRAM REVIEW – Mathematics

The final summary of the program review process for Mathematics is attached to this page.

I affirm that this program has been reviewed according to the accepted District procedures for program review and that the final summary accurately reflects the consensus of the members of the review committee.

James McClain, Dean of Mathematics & Health Sciences

date

Michelle Plug, Articulation Officer

date

Dave Kary, Chair of Curriculum Committee

date

Irene Malmgren, Vice President of Academic Affairs

date

Nickawanna Shaw, Academic Senate President

date

Geraldine M. Perri, Superintendent/President

date

It will be the department's responsibility to communicate review recommendations with additional offices and services.

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1. Executive Summary

A. Program History/Description

Each semester, one of every three Citrus students completes a math class. Math courses are prerequisites or are strongly recommended for successful completion of 49 courses in other Citrus disciplines. Thus Mathematics is a core component of degree, certificate and transfer curriculum, especially in the sciences, engineering, vocational/technical, and health sciences (see Attachment C, Mathematics Program Impact Report). Since 80% of students enter college with math skills well below college-level and their graduation requirement has recently been raised to Intermediate Algebra, their mathematics education is the longest course sequence they face (see Liberal Arts and STEM sequences below).

Courses are offered in the day and evening, in early and late-start, 8-week fast track, online, and learning community formats. Mathematics facilities include two computer classrooms and the Math Success Center (tutoring center). All classrooms are equipped with multimedia presentation systems. Mathematics shares the STEM Center with science, technology, and engineering programs.

In September, 2011, the college was awarded a new five-year Title V HSI Cooperative Grant (RACE to STEM) in the amount of \$4,285,500; a five-year, HSI, STEM co-op grant with California State University Fullerton (\$147,091 first year) was also awarded. These grants will fund further development and exploration of supplemental instruction, tutoring, and peer-to-peer mentoring to improve student success among Hispanic and other underrepresented students in STEM fields.

B. Strengths/Effective Practices

Low student/teacher ratio and extensive classroom support services have enabled increasing attention to individual students; an experienced and motivated faculty; vigorous pursuit of grant funding to support innovation.

C. Weaknesses/Lessons Learned

Up to sixty sections of each math course are offered annually. This creates challenges for consistency although the department has learned that consistency must be balanced with academic freedom; modification of curriculum is needed to address changing students demographics and needs; the inverse relationship of time to completion and retention needs to be addressed; recognition that math is a two-track curriculum may imply substantial changes.

D. Recommendations/Next Steps

An effective assessment of each course's learning outcomes that promotes faculty discussion leading to consensus on grading and rigor would begin to address the need for consistency across the program. To facilitate effective assessment, a program review/SLO assessment database should be developed. This would greatly reduce time and effort in entry, storage, and retrieval of data, reduce data redundancy, reduce updating errors, increase consistency, increase data integrity, and improve data access.

Student success data in developmental math classes should be employed in the SLO assessment process to guide curriculum modification; innovative accelerated curriculum should be considered; degree programs should be reviewed and degree SLOs assessed.

2. Faculty

Full-Time Faculty

Anderson, Brian
Casey, David
Everest, Robert
Gong, Cathy
Gonzalez, Rudy
Gutierrez, Jesus
Low, Joyce
Medrano, Esmeralda
Nguyenhuu, Rick
Odrich, Steve
Paek, Heddy
Scott, Chris
Swan, Alfie
Swatzel, Paul
Tippins, Ralph
Trad, Mohamad
Tussy, Alan
White, Sheila
Zhuang, Eagle

Adjunct Faculty

Cheng, Tanshee
Chun, Mina
Kassab, Mohamed
Kim, Edward
Lei, Li
Leung, Sing
Luu, Kinh
Nalbandyan, Zorayr
Ng, Sun

Nguyen, Cynthia
Nguyen, Tracy

Ogimachi, Tom
Reagan, Di
Tseng, Kelly

3. Program description

Mathematics is the abstract deductive study of structure and pattern which serves as the foundation of science and technology. Transfer courses in mathematics emphasize the development of mathematical and quantitative reasoning skills beyond the level of intermediate algebra. Courses satisfy general education requirements for an associate degree in mathematics, an associate degree in liberal arts with an emphasis in mathematics, and lower division transfer. Pre-transfer level courses focus on drills, computation, arithmetic, basic word problems, applications involving area and perimeter, ratios and rates, and percentages.

4. Program Goals and Objectives

The goals and objectives of the Mathematics Program are:

- a) Deliver a mathematics curriculum that satisfies requirements for transfer to four-year institutions,
- b) Provide training in the mathematics skills necessary to complete career technical education certificates,
- c) Provide general, lower division mathematics coursework leading to an associate degree in the arts or the sciences,
- d) Deliver mathematics curriculum to improve basic math skills,

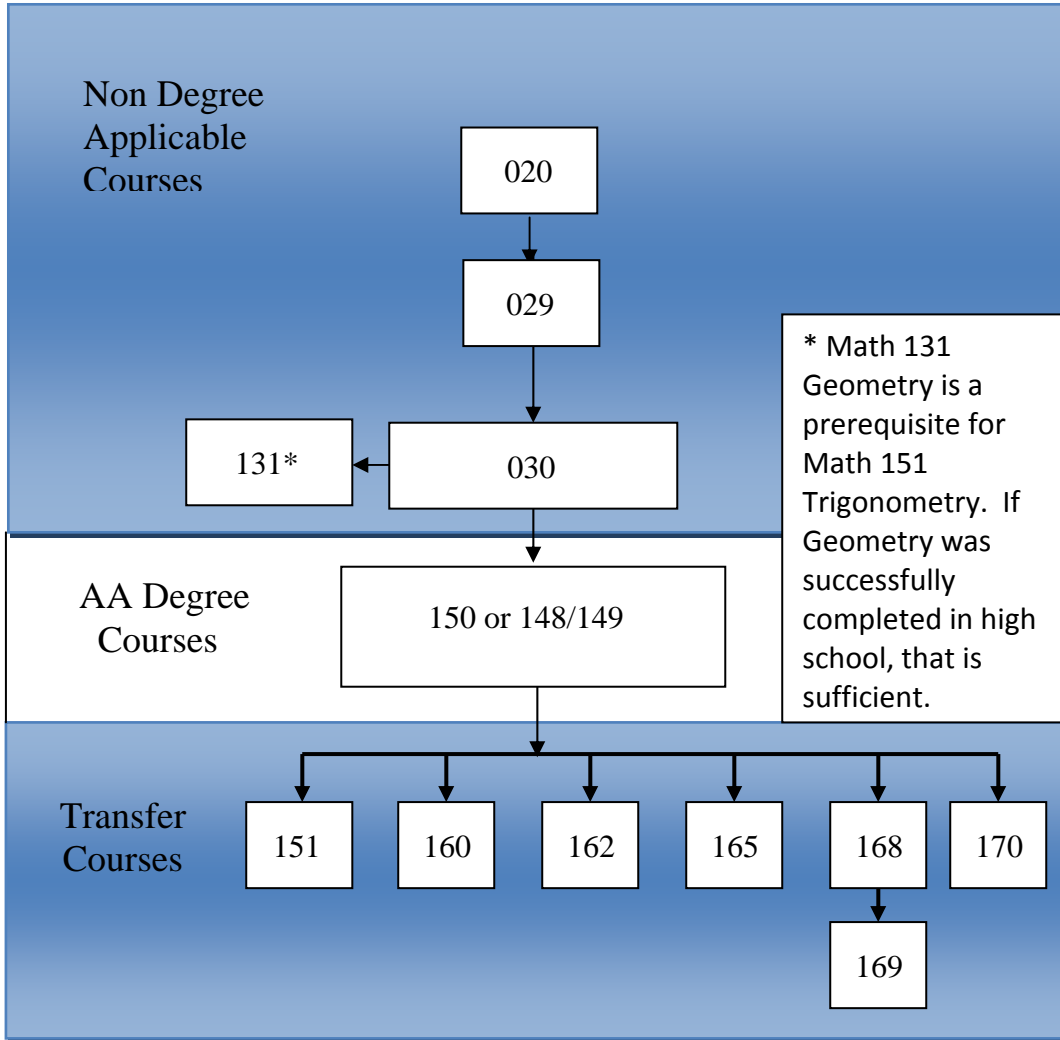
- e) Grant opportunities for students to develop a global perspective through a curriculum with international and multicultural applications, and
- f) Collaborate with local high schools in articulation and curriculum development.

5. List and Review of Degrees, Certificates, and Awards

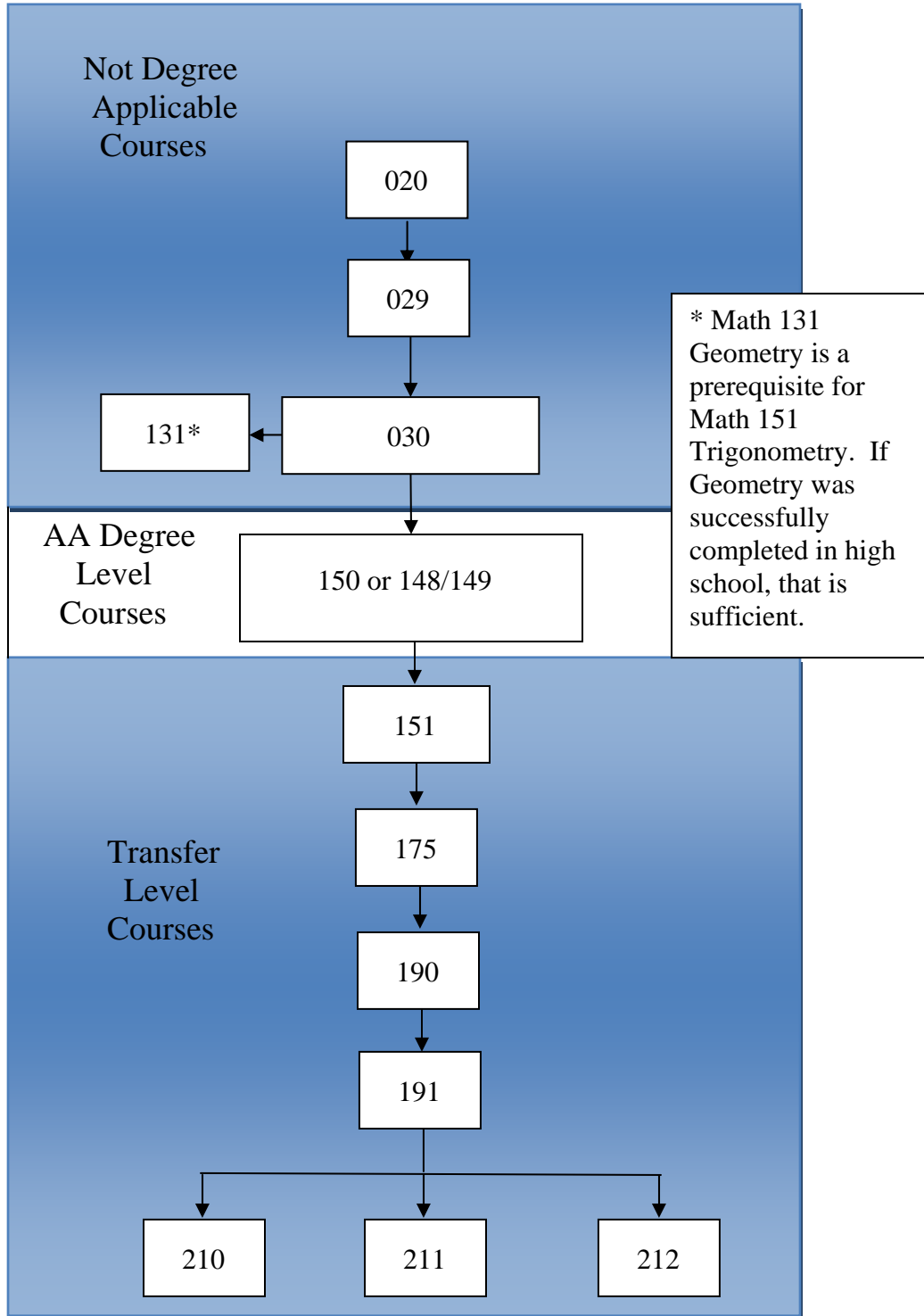
The AS-T in Mathematics degree was developed recently and is current in all respects. The Liberal Arts Math and Science degree was reviewed recently. It is recommended that a Math/Science committee be established to write SLO's for this degree and begin the assessment cycle by the end of Spring 2012 term. The Mathematics Department recommends elimination of the Biological and Physical Sciences (and Mathematics) degree.

Degree or Certificate Title	Date last reviewed by Curriculum	Average number of awards each year	Date degree SLOs written	Date degree SLOs Assessed	Date last reviewed by Advisory Council
Mathematics	2009	7	2009		n/a
Liberal Arts: Math and Science	2009	16			n/a
Biological and Physical Sciences (and Mathematics)	1950	130			n/a

MATHEMATICS Liberal Arts Sequence



MATHEMATICS STEM Sequence



6. List of Industry-Based Standard Certificates and Licenses

none

7. Advisory Committee or Council

n/a

8. Program Student Learning Outcomes

The Mathematics Program has adopted the Institutional General Education Competencies of Citrus College (as approved by Steering December 8, 2008). General education competencies serve as a common set of core curricular components identified and defined by faculty. Student learning outcomes are behaviors based on these competencies.

Any student transferring, completing a degree or certificate from Citrus College, must demonstrate effectively assessed awareness, understanding, knowledge, skills, and abilities in the selected competencies.

Students completing courses in the Mathematics Program will have acquired the following competencies:

1) Communication (personal expression and information acquisition)

- a. use proper vocabulary and notation when describing mathematical concepts.
- b. be able to read books and documents and extract quantitative information.

2) Computation

- a. develop level-appropriate computational skills: numeric calculation, evaluation of expressions, analysis of data and application of concepts.

3) Creative, Critical, and Analytical Thinking, and Information Competency

- a. develop an understanding of, and curiosity toward the physical world.
- b. develop the analytic skills to devise questions and propose quantitative solutions.

4) Community/Global Consciousness and Responsibility

- a. demonstrate computational skills and an understanding of mathematical reasoning that will increase self-esteem and set them on a path of life-long learning.

5) Technology

- a. be adept at using instructional software found by navigating the Web and the Windows environment. Specific skills such as the use of Excel will be demonstrated in classes such as Statistics (165); other applications will be used in appropriate classes.

6) Discipline / (Subject Area Specific Content Material)

- a. demonstrate competency at a level appropriate to the course. This "level" may range from arithmetic through differential equations and may include statistics, teacher prep and other topics.

9. Curriculum Review and Student Learning Outcomes Assessment

Curriculum/ SLO Assessment Map: Mathematics

CC 1: Use Correct Terminology				CC 4 (A): Demonstrate Abilities				
CC 2: Demonstrate/ Perform Accurate Calculations				CC 4 (B): Provide Culturally Advice				
CC 3: Develop Skills				CC 5: Use Current Technologies				
				CC 6: Provide Appropriate Care				
Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award SLO Key: I= Introduced, D=Developed, M=Mastered								
	CC1	CC2	CC3	CC4 (A)	CC4 (B)	CC5	CC6	Date of Assessment= FA10, SP12 or CA=(Ongoing, Continuing Assessment)

MATH 020 –Arithmetic Fundamentals (1 Unit), Applicability-D Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>4/17</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Scheduled for Spring 2012

MATH 029 –Prealgebra (4 Units), Applicability-D Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA11</u> , Curriculum Revision Date: <u>10/16</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Scheduled for Spring 2012

MATH 30 –Elementary Algebra (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA11</u> , Curriculum Revision Date: <u>12/17</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Scheduled for Spring 2012

MATH 131 –Plane Geometry (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA10</u> , Curriculum Revision Date: <u>10/16</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Scheduled for Spring 2012

MATH 148 –Intermediate Algebra I (2.5 Units), Applicability-__D Last Offered- <u>2/11</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Pending next scheduled offering
MATH 149 –Intermediate Algebra II (2.5 Units), Applicability-__ Last Offered- <u>8/11</u> , Last Curriculum Date: <u>FA11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Pending next scheduled offering
MATH 150 – Intermediate Algebra (5 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I	I	I	Scheduled for Spring 2012
MATH 151 –Plane Trigonometry (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP10</u> , Curriculum Revision Date: <u>5/16</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 160 –Survey of Mathematics (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 162 –Introductory Mathematical Analysis (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA10</u> , Curriculum Revision Date: <u>10/16</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 165 –Introductory Statistics (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA08</u> , Curriculum Revision Date: <u>12/14</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 168 –Mathematics for Elementary Teachers I (4 Units), Applicability-__ Last Offered- <u>8/10</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Pending next scheduled offering

MATH 169 –Mathematics for Elementary Teachers II (4 Units), Applicability-__ Last Offered- <u>2/11</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Pending next scheduled offering
MATH 170 –College Algebra (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA10</u> , Curriculum Revision Date: <u>10/16</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 175 –Pre-Calculus (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA10</u> , Curriculum Revision Date: <u>10/16</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 190 –Calculus with Analytic Geometry I (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 191 –Calculus with Analytic Geometry II (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP08</u> , Curriculum Revision Date: <u>3/14</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 210 –Calculus with Analytic Geometry III (4 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>FA09</u> , Curriculum Revision Date: <u>12/15</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 211 –Differential Equations (5 Units), Applicability-__ Last Offered- <u>2/12</u> , Last Curriculum Date: <u>SP11</u> , Curriculum Revision Date: <u>3/17</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012
MATH 212 –Introduction to Linear Algebra (4 Units), Applicability-__ Last Offered- <u>8/11</u> , Last Curriculum Date: <u>SP08</u> , Curriculum Revision Date: <u>6/14</u>								
SLO 1	I	I,D	I,D	I,D	I,D	I,D	I	Scheduled for Spring 2012

10. Review of previous recommendations

Mission

a) We need to explore ways to advance more Basic Skills students to our upper level courses: learning communities, support services such as tutoring, and outreach to high schools.

--Response: Math 029 Pre-Algebra was redesigned to allow more instructional time; grant funded (STEM and BSI) learning communities, tutoring, supplemental instruction, the PAGE program; changes to basic skill curriculum have decreased the time to completion.

b. We need to attract more diverse and qualified faculty applicants.

--Response: HR has widely advertised faculty positions in diverse publications; job postings include diversity statements.

c. Need to consistently schedule diverse instructors as role models in our higher level courses.

--Response: Instructors of higher level classes now reflect diversity.

Need

a) Adjust offerings to reflect new graduation requirements.

--Response: Curriculum changes have been approved to reflect new graduation requirements.

b) Increase dialogue with K-12 to plan for near horizon trends.

--Response: math faculty participate in Duarte/Glendora CaMSP grant and Discipline Dialog conference with AUSD teachers resulting in better understanding of curriculum alignment.

c) Increase dialogue with transfer institutions to develop transfer guarantees.

--Response: department participated in grant partnerships with ULV, CS Fullerton, dialog with UCR, Cal Poly Pomona, SB 1440 and new transfer degrees have also addressed this need.

d) Dialogue with other departments to establish math prerequisites/recommendations for their courses.

--Response: prerequisites have been established in many courses; new prerequisite task force will address needs for additional math prerequisites.

e) Encourage counseling to direct Basic Skills students to take math courses EARLY in their Citrus careers.

--Response: STEM counselors imbedded in the math program have been very effective in guiding students.

f) Address impacted enrollment issues by exploring strategies to increase student success and program efficiency.

--Response: The department has made extensive revisions to basic skills curriculum, and is testing a new format for delivering Math 020.

QUALITY

- a) Cut-scores on the Placement Test need to be re-examined to continually improve student placement.
 --Response: cut scores are examined annually and recommendations forwarded to the Matriculation and Assessment Committee; a comprehensive cut score study was completed Fall '11.
- b) Examine content of differential equations course and look at the possibility of a course beyond differential equations.
 --Response: after considering this curriculum, linear algebra course was added to the program .
- c) Review courses that have been impacted by 16-week schedule.
 --Response: after review, Math 160, 168/169, 211 were modified for compatibility with the 16-week schedule.
- d) A common assessment tool should be investigated for courses with multiple sections
 --Response: a common final exam is now used in several courses but could still be implemented in others; compliance from faculty is not mandatory.
- e) Improve effectiveness of annual SLO assessment.
 --Response: department has developed and is testing a pilot SLO assessment process while awaiting specifics from the governing body
- f) Instructors in basic skills courses should be trained in techniques to reach adult learners of remedial material.
 --Response: grant-funded workshops and mentoring by faculty leads has addressed this need.
- g) Improve consistency in course content [across courses with multiple offerings].
 --Response: faculty leads are addressing quality control with course standards and common final exams are providing some assessment of progress with consistency; grant-funded faculty inquiry groups.
- h) Improve alignment of curriculum in the mathematics course sequence
 --Response: department meetings involve curriculum review and began in Spring '11 with the curriculum below college-level, Math 130, 029, 020 and 017; significant modifications have been made; cohort tracking by Institutional Research is informing this process.
- i) Establish math faculty mentoring program for new hires.
 --Response: no new hires since '08; new hires anticipated in 2012.

FEASIBILITY

- a) Improve quality of tutors in the Math Success Center by improving training, especially when working with Basic Skills students, and by hiring tutors who can tutor statistics.
 --Response: grant funding has provided consistency in tutoring supervision, hiring and training along with collaboration with the Learning Center.
- b) Increase office space for full time math faculty.
 --Response: this need has been addressed with the addition of math offices in the Center for Innovation.
- c) Work with counseling to get more basic skills students to take math courses in their first year.

- Response: duplication -- see (e) under Need above.
- d) New building needs improved climate control, more window blinds to prevent glare, relocation of some screens in classrooms, signage, and furniture in open areas.
- Response: these physical issues have been addressed to the extent possible; some projection screens could not be moved.
- e) Improve instructional facilities in the MA building.
- Response: wireless data nodes have been installed in MA.
- f) Institutionalize successful grant-funded Basic Skills activities.
- Response: Math budget for 2011-12 included district funding for Success Center and STEM Center previously grant-funded.
- g) Seek support for continuing successful STEM grant instructional support services.
- Response: college applied for and was awarded STEM 2 grant.

COMPLIANCE

- a) Seek state approval for an A.S. degree in Mathematics.
- Response: application submitted to Chancellor's Office and approved November 2011; AS-T (transfer) Degree in Mathematics is now available.

11. Evaluation Criteria – Mission

Current status

The program has experienced many successes among the diverse student population it serves. These include students receiving national recognition from NASA, disabled students finishing at the top of their math classes, and former students attaining careers in business and medicine.

The department has recently reviewed and modified its developmental math curriculum based on cohort tracking information from IR. This requires monitoring and the rest of the math sequence has not been tracked and evaluated from this perspective.

Commendations

- a. The program has effectively used grant funding to address student success with manifold support services and innovative instructional support.

Recommendations

- a. Complete the program assessment and student placement study with additional cohort tracking data from IR. Implementing changes to cut scores where indicated.

12. Evaluation Criteria – Need

Current status

Math courses are prerequisites or are strongly recommended for successful completion of 49 courses in other Citrus disciplines. Math is a core component of degree and transfer curriculum, and required in the sciences, engineering, vocational/technical and health

occupations. Mathematics is such a pervasive component of the college's curriculum that it is not an exaggeration to suggest growth and quality in much of the institution's educational program depends on growth and quality in Mathematics.

Although most jobs require more than high school level math skills, 70% of district students enter Citrus with math skills far below college level. This incongruity spotlights an effective mathematics program as a key to realizing the college's vision to "help students meet economic, social, and environmental challenges" and its mission to "empower students to compete globally" and support their pursuit of "economic opportunity." It is therefore significant that budget deficiencies have forced reductions to all course offerings and even elimination of some. The program is impacted. It is not fully meeting the community's need for math education.

Commendations

- a. The Citrus mathematics program has a well-developed sequence of instruction that addresses the needs of basic skills, transfer and career technical education.

Recommendations

- a. Funding permitting, expand class offerings to meet the critical need for additional math classes and courses no longer scheduled due to budget cuts (Math 148/149; 168/169).
- b. Evaluate possible accelerated curriculum and consider the two-track (liberal arts, STEM) nature of the program and modify curriculum where indicated.

13. Evaluation Criteria – Quality

Current status

SLO's have been developed for all math courses. Assessment has been ongoing since 2008 but intermittent. Consequently unit value of a few courses may not be suitable. The large size of the department (currently 19 faculty) makes department cohesion a challenge.

Commendations

- a. The department has obtained approval for its degree program aligned with transfer model curriculum.
- b. The department has employed grant funding to implement and develop best practices in basic skills education.
- c. The department was among the first in the college to complete course and program-level SLO's.
- d. Despite extensive schedule cuts, essential course offerings have been maintained.

Recommendations

- a. Improve SLO assessment cycle to promote consistency, efficiency, relevance and documentation.
- b. Assess Math 170, 175, 190, 191 and 210 for appropriate unit value and modify curriculum as needed.

14. Evaluation Criteria – Feasibility

Current status

The department has lost more faculty to retirement and budget cuts than have been replaced. Two math classrooms have been reassigned. Computers and peripherals are aging; no replacements or improvements (e.g. shared printers, copiers, document cameras, expanded wireless access) are budgeted. Math learning communities have higher retention and success rates but grant funding that supports them will expire. Successful grant-funded program support can only continue with district funding.

Commendations

- a. Imbedded STEM counselors have been a tremendous asset for student success and career guidance.

Recommendations

- a. Recommend the continuation of imbedded counselors.
- b. Consider a new course that combines Math 130 and Math 150 curriculum.
- c. Develop department activities that support faculty cohesion.
- d. Support and expand learning communities.
- e. Replace shared printers and copy machines on MA 1st and 2nd floor.

15. Evaluation Criteria – Compliance

Current status

The relatively new MA building was constructed to fire and accessibility codes but configuration of furniture and equipment in classrooms can fluctuate with enrollment and logistics.

Commendations

- a. The MA building is code-compliant and is has been maintained in good condition.

Recommendations

- a. Establish annual review of math classroom configurations for compliance with fire and accessibility regulations (Campus Safety Coordinator).

16. Recommendations

Rank	Description of recommendation (actions or behaviors to be completed)	Responsible person(s)	Target Date	Personnel	Facilities	Equip. / Software	Supplies
1	Expand class offerings to meet the critical need for additional math classes and courses no longer scheduled due to budget cuts (Math 148/149; 168/169).	VP of Instr; dean	Aug. 2014	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Complete the program assessment and revise curriculum: two-track, accelerated?	faculty	Aug. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Implement an effective SLO assessment cycle that promotes consistency - consider a grade-based SLOA strategy	faculty	Jan. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Assess Math 170, 175, 190, 191 and 210 for appropriate unit value and modify curriculum as needed	faculty	Aug. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Develop department activities that support faculty unity	faculty; dean	Jan. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Regularly participate in Counseling meetings to increase communication regarding placement	faculty; dean	Jan. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Consider a new course that combines Math 130 and Math 150 curriculum	faculty	June 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Replace shared printers and copy machines on MA 1st and 2nd floor	VP Inst; dean	Aug. 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	Support and expand learning communities	faculty; dean; VP	Jan. 2013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Establish annual review of math classroom configurations for compliance with fire and accessibility regulations.	Campus Safety Coord.	Jan 2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

The chart summarizes the recommendations in sections 11-15 above.

17. Budget Recommendations

Resources are needed in the following areas:

Certificated Personnel (FNIC)

Position	Discuss impact on goals / SLOs	Impact ◇	Priority ‡
Math Instructor, tenure track		M, N	C
Math Instructor, tenure track		M, N	C

Classified Personnel

Position	Discuss impact on goals / SLOs	Impact ◇	Priority ‡

Facilities

Facilities / repairs or modifications needed	Discuss impact on goals / SLOs	Bldg / Room	Impact ◇	Priority ‡

Computers / Software (Tecs)

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡

Equipment

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡
Color & B/W printers in MA 1 st & 2 nd floor	Communication with students and staff	\$ 3,000		C
Document cameras	Clearer classroom delivery	\$ 8,000		C
Upgrade MA classroom computers	increased reliability for instructional delivery	\$20,000		
Complete Wi-fi in MA	increased student access to online class information	\$5,000		
Replace CI Tracker computer in the MSC	increased reliability of tracking data	\$ 2,000		
Upgrade MHS faculty office computers		\$60,000		
Develop program review and SLOA database	Reduced data entry, storage, and retrieval costs ; Reduced data redundancy; Reduced updating errors and increased consistency; Greater data integrity; Improved data access;	?		

Supplies (Division)

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡

◇ **Impact:**

M = Mission: Does program meet the District's mission and established core competencies? Does program reflect the District's diversity?

N = Need: How is program addressing needs based on labor market data, enrollment, articulation, advisory committee, regional agreements, etc.?

Q = Quality: Are lecture/lab unit values appropriate? Have the course outlines been reviewed / updated regularly? Are disciplines appropriate? Is faculty development adequate? Does program support State and District emphasis on critical thinking, problem solving and written expression? Does program meet stated objectives in the form of SLOs? Are course pre-requisites and co-requisites validated?

F = Feasibility: Are facilities, equipment, and library resources adequate? Are evening programs and services adequate? Are course offerings frequent enough for students to make adequate progress in both day and evening programs? Does the program have adequate communication with & support from Counseling?

C = Compliance: Do course requisites meet Federal, State & District requirements? Do the course outlines meet state, district & federal regulations for content? Do vocational programs have regular advisory meetings?

‡ **Priority: (Note: When discussing priority, consider the following and address in Column 2)**

A. Is this goal mandated by law, rule, or district policy?

B. Is this goal essential to program success?

C. Is this goal necessary to maintain / improve program student learning outcomes?

Attachment A: Key Performance Indicator data pages

Key Performance Indicators		Fall04	Fall05	Fall06	Fall07	Fall08	Fall09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered	19.0	20.0	21.0	20.0	20.0	18.0
4	Sections Offered	130.0	132.0	138.0	138.0	146.0	116.0
5	Morning Secions	52.0	50.0	64.0	62.0	66.0	61.0
6	Afternoon Sections	38.0	44.0	39.0	38.0	45.0	35.0
7	Evening Sections	36.0	34.0	35.0	32.0	28.0	15.0
8	Arranged Sections	1.0	3.0				
9	Weekend Sections				4.0	5.0	
10	Short Term Sections			4.0	6.0	10.0	8.0
11	DistanceEd Full-Term Sections	3.0	1.0		2.0	2.0	5.0
12	DistanceEd Short-Term Sections						
13	Enrollment	4042	3916	4118	4376	4842	4440
14	Weekly Student Contact hours (WSCH)	17231.7	16274.1	17098.4	16886.5	25108.3	21814.7
15	Full-Time Equivalent Students (FTES)	590.8	558.0	586.2	521.1	774.8	673.1
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)	36.8	36.7	37.9	34.7	48.6	37.3
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF	468.9	443.6	451.7	486.8	517.1	585.5
19	FTES/FTEF	16.1	15.2	15.5	15.0	16.0	18.1
20	Fill Rate at Census	86.3	82.4	81.7	79.5	82.6	92.3
Program Success							
21	Course Retention	84.5	85.9	84.3	90.2	89.2	89.2
22	Course Success	53.0	51.8	52.6	53.2	55.6	59.2

	Key Performance Indicators				Winter08	Winter09	Winter10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Program Access						
1	Majors (total)						
2	New Majors						
3	Courses Offered				12.0	12.0	8.0
4	Sections Offered				24.0	21.0	12.0
5	Morning Secions				10.0	9.0	6.0
6	Afternoon Sections				9.0	8.0	6.0
7	Evening Sections				5.0	4.0	
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections				24.0	21.0	12.0
11	DistanceEd Full-Term Sections						
12	DistanceEd Short-Term Sections						
13	Enrollment				797	767	482
14	Weekly Student Contact hours (WSCH)				3997.1	4021.1	2362.2
15	Full-Time Equivalent Students (FTES)				123.3	124.1	72.9
	Program Resources						
16	Full-Time Equivalent Faculty (FTEF)				7.9	7.1	3.8
17	Credit Reimbursement Rate				\$3,668.28	\$3,834.46	\$3,834.46
	Program Operation						
18	WSCH/FTEF				507.9	564.8	615.1
19	FTES/FTEF				15.7	17.4	19.0
20	Fill Rate at Census				85.2	91.0	100.8
	Program Success						
21	Course Retention				93.9	92.6	93.6
22	Course Success				73.5	73.1	75.7

	Key Performance Indicators	Spring05	Spring06	Spring07	Spring08	Spring09	Spring10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered	19.0	21.0	22.0	22.0	21.0	18.0
4	Sections Offered	132.0	137.0	133.0	127.0	111.0	102.0
5	Morning Sections	50.0	59.0	62.0	57.0	58.0	53.0
6	Afternoon Sections	36.0	43.0	44.0	38.0	30.0	29.0
7	Evening Sections	39.0	29.0	24.0	26.0	19.0	13.0
8	Arranged Sections	5.0	3.0				
9	Weekend Sections			2.0	4.0	1.0	
10	Short Term Sections		1.0	5.0	4.0	8.0	6.0
11	DistanceEd Full-Term Sections	2.0	3.0	1.0	2.0	2.0	7.0
12	DistanceEd Short-Term Sections					1.0	
13	Enrollment	3649	3764	3711	3736	3937	3898
14	Weekly Student Contact hours (WSCH)	15710.0	15984.2	15538.0	16323.0	20455.9	18843.9
15	Full-Time Equivalent Students (FTES)	538.6	548.0	532.7	503.7	631.2	581.5
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)	37.9	38.6	36.7	36.2	37.2	28.9
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF	414.3	414.5	423.5	451.0	549.9	651.4
19	FTES/FTEF	14.2	14.2	14.5	13.9	17.0	20.1
20	Fill Rate at Census	77.6	73.6	72.9	72.5	85.9	92.9
Program Success							
21	Course Retention	82.9	83.7	84.5	88.7	89.3	90.8
22	Course Success	49.6	52.2	51.0	53.8	54.3	57.1

	Key Performance Indicators	Summer04	Summer05	Summer06	Summer07	Summer08	Summer09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered	8.0	8.0	10.0	10.0	11.0	12.0
4	Sections Offered	29.0	31.0	35.0	35.0	30.0	20.0
5	Morning Secions	8.0	12.0	15.0	14.0	11.0	9.0
6	Afternoon Sections	10.0	11.0	11.0	11.0	10.0	7.0
7	Evening Sections	10.0	8.0	9.0	9.0	9.0	2.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections	28.0	31.0	35.0	34.0	30.0	18.0
11	DistanceEd Full-Term Sections						
12	DistanceEd Short-Term Sections	1.0			1.0		2.0
13	Enrollment	915	875	959	1045	947	765
14	Weekly Student Contact hours (WSCH)	3887.0	3752.9	4089.2	4501.0	4749.3	3567.7
15	Full-Time Equivalent Students (FTES)	133.3	128.7	140.2	154.3	146.6	110.1
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)	8.2	9.0	9.8	9.9	10.1	6.1
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF	471.7	416.5	417.7	456.5	470.2	585.8
19	FTES/FTEF	16.2	14.3	14.3	15.7	14.5	18.1
20	Fill Rate at Census	83.9	70.3	66.8	71.7	83.5	93.3
Program Success							
21	Course Retention	93.1	93.8	92.4	88.6	100.0	91.5
22	Course Success	70.5	72.8	68.9	69.8	78.5	66.5

			04-05		05-06		06-07		07-08		08-09		09-10	
			Year1		Year2		Year3		Year4		Year5		Year6	
Gender														
	MATH	Female	3499	55.2%	3500	55.8%	3451	54.4%	3772	54.1%	3932	52.5%	3728	53.5%
	MATH	Male	2844	44.8%	2769	44.2%	2897	45.6%	3145	45.1%	3368	45.0%	3098	44.5%
	MATH	Missing	1	0.0%					58	0.8%	192	2.6%	141	2.0%
	MATH	Total	6344	100.0%	6269	100.0%	6348	100.0%	6975	100.0%	7492	100.0%	6967	100.0%
Age														
	MATH	19 or younger	2535	40.0%	2566	40.9%	2751	43.3%	2933	42.1%	3269	43.6%	2853	41.0%
	MATH	20-24	2457	38.7%	2440	38.9%	2399	37.8%	2753	39.5%	2885	38.5%	2786	40.0%
	MATH	25-29	607	9.6%	591	9.4%	557	8.8%	606	8.7%	639	8.5%	656	9.4%
	MATH	30-34	246	3.9%	211	3.4%	225	3.5%	263	3.8%	264	3.5%	265	3.8%
	MATH	35-39	179	2.8%	168	2.7%	160	2.5%	169	2.4%	173	2.3%	168	2.4%
	MATH	40-49	230	3.6%	227	3.6%	193	3.0%	184	2.6%	191	2.5%	170	2.4%
	MATH	50 and above	88	1.4%	66	1.1%	59	0.9%	65	0.9%	69	0.9%	69	1.0%
	MATH	Missing	2	0.0%			4	0.1%	2	0.0%	2	0.0%		
	MATH	Total	6344	100.0%	6269	100.0%	6348	100.0%	6975	100.0%	7492	100.0%	6967	100.0%
Ethnicity														
	MATH	Asian	848	13.4%	715	11.4%	694	10.9%	643	9.2%	609	8.1%	344	4.9%
	MATH	Black or African American	354	5.6%	335	5.3%	341	5.4%	390	5.6%	399	5.3%	281	4.0%
	MATH	Hispanic/Latino	2777	43.8%	2923	46.6%	3022	47.6%	3318	47.6%	3421	45.7%	2494	35.8%
	MATH	American Indian or Alaska Native	42	0.7%	45	0.7%	46	0.7%	48	0.7%	47	0.6%	36	0.5%
	MATH	Native Hawaiian or Other Pacific Islander							40	0.6%	58	0.8%	32	0.5%
	MATH	White	1872	29.5%	1826	29.1%	1813	28.6%	1806	25.9%	1706	22.8%	1178	16.9%
	MATH	Two or More Races											28	0.4%
	MATH	Unknown/Non-Respondent	451	7.1%	425	6.8%	432	6.8%	730	10.5%	1252	16.7%	2574	36.9%
	MATH	Total	6344	100.0%	6269	100.0%	6348	100.0%	6975	100.0%	7492	100.0%	6967	100.0%
Educational Goal														
	MATH	Degree & Transfer	3198	50.4%	3293	52.5%	3372	53.1%	1112	15.9%	2199	29.4%	2766	39.7%
	MATH	Transfer	1823	28.7%	1761	28.1%	1757	27.7%	307	4.4%	503	6.7%	767	11.0%
	MATH	AA/AS	310	4.9%	297	4.7%	312	4.9%	804	11.5%	1471	19.6%	1043	15.0%
	MATH	License	255	4.0%	213	3.4%	223	3.5%	56	0.8%	89	1.2%	67	1.0%
	MATH	Certificate	227	3.6%	233	3.7%	228	3.6%	42	0.6%	76	1.0%	81	1.2%
	MATH	Job Skills	117	1.8%	97	1.5%	86	1.4%	139	2.0%	312	4.2%	303	4.3%
	MATH	Basic Skills							104	1.5%	199	2.7%	95	1.4%
	MATH	Personal								2	0.0%	57	0.8%	
	MATH	Undecided							334	4.8%	686	9.2%	915	13.1%
	MATH	Not Reported	414	6.5%	375	6.0%	370	5.8%	4077	58.5%	1955	26.1%	873	12.5%
	MATH	Total	6344	100.0%	6269	100.0%	6348	100.0%	6975	100.0%	7492	100.0%	6967	100.0%

	<i>Key Performance Indicators</i>	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
		Year1	Year2	Year3	Year4	Year5	Year6
Program Resources							
23	Revenue: FTES*Reimbursement Rate	\$3,668,393.25	\$4,005,433.86	\$4,359,365.12	\$4,769,571.02	\$6,340,816.43	\$5,462,878.47
24	Total District Adopted Program Budget	2,181,947	2,350,293	2,575,938	2,742,340	3,325,744	3,261,357
25	Support Personnel (wage without benefit, 2200 and 2400 in budget)	25,414	30,936	27,199	44,057	28,068	28,068
26	Supplies (4300 in budget)	3,929	6,950	5,407	12,542	14,159	12,494
27	Cost	2,165,100	2,325,297	2,557,923	2,612,209	3,290,999	
28	Total FTES for the year	1256.17	1228.77	1254.01	1300.22	1653.64	1424.68
29	Cost per FTES	\$1,723.57	\$1,892.38	\$2,039.79	\$2,009.05	\$1,990.15	
Degrees and Certificates							
30	Degree: Biological and Physical Scienc	111	124	123	108	146	147
31	Certificates						
32	Skill Awards						
33	Licenses (reported by department)						
Career Technical Education Programs							
34	VTEA Grant						
35	Industry Contributions to Program Resources						
36	Available Jobs						
37	Attach one copy of the three most recent College Core Indicator Information forms for each of the appropriate TOP codes						
38	Please include "Student Satisfaction" and "Employer Satisfaction" in the program review write-up.						
39	Labor market data						

Attachment B: Mathematics Course-Level Student Learning Outcomes

Math 020 Arithmetic Fundamentals

Use standard form and techniques in calculations involving whole numbers, fractions, decimals, ratios, proportions, and percents with all of its related applications and demonstrate scholarly behavior in all class interactions.

Math 029 Pre-Algebra

Use standard form and techniques in calculations involving a review of arithmetic and a study of signed numbers as well as showing adequacy with an introduction to fundamental algebraic concepts, solving equations, and solving applied problems while simultaneously demonstrating scholarly behavior in all class interactions.

Math 030 Elementary Algebra

Use standard form and techniques in working with fundamental operations with polynomials and rational expressions, products and factoring, linear and quadratic equations in one variable, inequalities, exponents, radicals, graphing linear equations, systems of equations, applications and an introduction to functions and simultaneously demonstrate scholarly behavior in all class interactions.

Math 131 Plane Geometry

Use standard form and techniques in working with elementary logic, properties of geometric figures, parallel and perpendicular lines, ratio and proportion, congruence, area, and volume along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 148 Intermediate Algebra I

Use standard form and techniques in working with real number properties, first degree equations and inequalities, absolute value equations and inequalities, formulas, applications, exponents, polynomials, the binomial theorem, factoring, linear systems, and functions and simultaneously demonstrate scholarly behavior in all class interactions.

Math 149 Intermediate Algebra II

Use standard form and techniques in working with rational expressions, variation, radicals, complex numbers, quadratic equations, applications, conics, inverse functions, and exponential and logarithmic functions and simultaneously demonstrate scholarly behavior in all class interactions.

Math 150 Intermediate Algebra

Use standard form and techniques in working with real number properties, first degree equations and inequalities, absolute value equations and inequalities, formulas, applications, exponents, polynomials, the binomial theorem, factoring, linear systems, functions, rational expressions, variation, radicals, complex numbers, quadratic equations, conics, inverse functions, and exponential and logarithmic functions and simultaneously demonstrate scholarly behavior in all class interactions.

Math 151 Plane Trigonometry

Use standard form and techniques in working with functions, the trigonometric functions, their graphs and identities, laws of sines and cosines, solutions of triangles, trigonometric equations, inverse trigonometric functions, polar coordinates, and DeMoivre's Theorem along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 160 Survey of Mathematics

Use standard form and techniques in working with sets and logic, problem solving, numeration systems, consumer applications, geometry, probability, and statistics along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 162 Introductory Mathematical Analysis

Use standard form and techniques while demonstrating proficiency with limits, differentiation, and integration with its associated applications and demonstrate scholarly behavior in all class interactions.

Math 165 Introductory Statistics

Use standard techniques in working with statistics and probability, descriptive analysis, and presentation of data, hypothesis testing, statistical inference, normal curve, chi square, and applications in diverse disciplines along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 168 Mathematics for Elementary Teachers I

Use standard form and practices in working with sets, number systems, number theory and algebra functions as well as exploring techniques in instructional delivery and simultaneously demonstrate scholarly behavior in all class interactions.

Math 169 Mathematics for Elementary Teachers II

Use standard form and techniques in working with measurement, geometry, probability, statistics, and the design of instruction delivery along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 170 College Algebra

Use standard techniques in working with polynomial, rational, exponential, and logarithmic functions, matrices and determinants, theory of equations, analytic geometry, and mathematical induction along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 175 Pre-Calculus

Use proper notation and standard techniques in working with polynomial, rational, exponential, logarithmic, and trigonometric functions, analytic geometry, and mathematical induction along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 190 Calculus with Analytic Geometry I

Use standard form and techniques in working with differential and integral calculus with applications, functions, limits, continuity, techniques of differentiation, exponential, logarithmic, and inverse trigonometric functions along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 191 Calculus with Analytic Geometry II

Use standard form and techniques in working with vectors, calculus of functions of more than one variable, partial derivatives, multiple integration, vector calculus, Green's Theorem, Stokes' Theorem, and the divergence theorem along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 210 Calculus with Analytic Geometry III

Use standard form and techniques in working with vectors, calculus of functions of more than one variable, partial derivatives, multiple integration, vector calculus, Green's Theorem, Stokes' Theorem, and the divergence theorem along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 211 Differential Equations

Use standard form and techniques in working with modeling applications, numerical methods, basic linear algebra, systems of linear and non-linear differential equations and their applications, application of linear algebra to systems, and power series methods along with simultaneously demonstrating scholarly behavior in all class interactions.

Math 212 Linear Algebra

Use proper notation and standard techniques in working with systems of linear equations, matrix operations, determinants, vectors and vector spaces, eigenvalues, eigenvectors, and linear transformations along with simultaneously demonstrating scholarly behavior in all class interactions.

Attachment C: Mathematics Program Impact Report

Mathematics courses and the certificate and degree programs they impact:

MATH 030 (formerly 130)

1. ADVANCED DRAFTING TECHNOLOGY - CAD Certificate of Achievement *Program Inactivation*
2. ADVANCED DRAFTING TECHNOLOGY - CAD Certificate of Achievement *New Program*
3. Automotive Service, Diagnosis & Repair - Master Technician Certificate of Achievement *New Program*
4. Automotive Service, Diagnosis and Repair - Toyota/Lexus/Scion Technician Certificate of Achievement *modification*
5. Automotive Service, Diagnosis and Repair - Toyota/Lexus/Scion Technician Certificate of Achievement *New Program*
6. Automotive Service, Diagnosis, and Repair - Master Technician Certificate of Achievement *Program Modification*
7. HIGH PERFORMANCE INSTITUTE Certificate of Achievement *New Program*

MATH 115

1. Automotive Service, Diagnosis & Repair - Master Technician Certificate of Achievement *New Program*
2. Automotive Service, Diagnosis and Repair - Toyota/Lexus/Scion Technician Certificate of Achievement *New Program*
3. Automotive Service, Diagnosis and Repair - Toyota/Lexus/Scion Technician Certificate of Achievement *modification*
4. Automotive Service, Diagnosis, and Repair - Master Technician Certificate of Achievement *Program Modification*
5. HIGH PERFORMANCE INSTITUTE Certificate of Achievement *New Program*
6. PUBLIC WORKS I Certificate of Achievement *Program Modification*
7. PUBLIC WORKS I Certificate of Achievement *New Program*
8. WATER TECHNOLOGY Certificate of Achievement *Program Modification*
9. WATER TECHNOLOGY Certificate of Achievement *New Program*
10. WATER TECHNOLOGY Certificate of Achievement *Program Modification*
11. WATER TECHNOLOGY Certificate of Achievement *Program Modification*

MATH 148

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*

MATH 149

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*

MATH 150

1. Automotive Research and Development Certificate of Achievement *New Program*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
3. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
4. Drafting Technology A.S. Degree *New Program*
5. PUBLIC WORKS II Certificate of Achievement *Program Modification*

MATH 151

1. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
2. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
3. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*

MATH 160

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
3. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
4. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
5. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
6. Liberal Studies - Elementary Teacher Preparation Path A.A. Degree Major *New Program*
7. Liberal Studies - Elementary Teacher Preparation Path A.A. Degree Major *New Program*

MATH 162

1. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
2. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
3. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*

MATH 165

1. Administration of Justice A.S.-Transfer Degree *New Program*
2. Biological Sciences A.S. Degree *Program Modification*
3. Biological Sciences A.S. Degree *New Program*
4. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
5. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
6. Business A.S. Degree *New Program*
7. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
8. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
9. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
10. Psychology A.A.-Transfer Degree *New Program*
11. Sociology A.A.-Transfer Degree *New Program*

MATH 168

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
3. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
4. Liberal Studies - Elementary Teacher Preparation Path A.A. Degree Major *New Program*
5. Liberal Studies - Elementary Teacher Preparation Path A.A. Degree Major *New Program*

MATH 169

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
3. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
4. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
5. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
6. Liberal Studies - Elementary Teacher Preparation Path A.A. Degree Major *New Program*

MATH 170

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*

3. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
4. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
5. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*

MATH 175

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
3. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
4. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
5. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*

MATH 190

1. Biological Sciences A.S. Degree *New Program*
2. Biological Sciences A.S. Degree *Program Modification*
3. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
4. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
5. Earth Science A.S. Degree *New Program*
6. Earth Science (Geology) A.S. Degree *New Program*
7. Earth Science (Geophysics) A.S. Degree *New Program*
8. Earth Science (Oceanography) A.S. Degree *New Program*
9. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
10. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
11. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
12. Mathematics A.S. Degree *New Program*
13. Mathematics A.S.-Transfer Degree *Program Modification*
14. Physics A.S.-Transfer Degree *New Program*
15. Psychology A.A.-Transfer Degree *New Program*
16. Sociology A.A.-Transfer Degree *New Program*

MATH 191

1. Biological Sciences A.S. Degree *Program Modification*
2. Biological Sciences A.S. Degree *New Program*
3. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
4. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
5. Earth Science A.S. Degree *New Program*
6. Earth Science (Geophysics) A.S. Degree *New Program*
7. Earth Science (Oceanography) A.S. Degree *New Program*

8. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
9. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
10. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
11. Mathematics A.S.-Transfer Degree *Program Modification*
12. Mathematics A.S. Degree *New Program*
13. Physics A.S.-Transfer Degree *New Program*

MATH 210

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
3. Earth Science A.S. Degree *New Program*
4. Earth Science (Geophysics) A.S. Degree *New Program*
5. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
6. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
7. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
8. Mathematics A.S.-Transfer Degree *Program Modification*
9. Mathematics A.S. Degree *New Program*
10. Physics A.S.-Transfer Degree *New Program*

MATH 211

1. Earth Science A.S. Degree *New Program*
2. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
3. Mathematics A.S.-Transfer Degree *Program Modification*
4. Mathematics A.S. Degree *New Program*

MATH 212

1. Biological and Physical Sciences (and Mathematics) A.S. Degree *New Program*
2. Biological and Physical Sciences (and Mathematics) A.S. Degree *Program Modification*
3. Liberal Arts with areas of Emphasis A.A. Degree Major *New Program*
4. Liberal Arts with areas of Emphasis A.A. Degree Major *Program Modification*
5. Liberal Arts: Emphasis in Math and Science A.A. Degree Major *New Program*
6. Mathematics A.S.-Transfer Degree *Program Modification*
7. Mathematics A.S. Degree *New Program*