



## **EDGE 2014 Program – The Formula that Works**

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Jerry O'Connor has been teaching physics (and a few engineering and math) courses since 1980. He has persistently promoted and supported the integration of findings from physics and engineering education research with education practice.

## ***EDGE 2014 Program – The Formula that Works***

### **Abstract**

This latest paper from the EDGE Program series briefly presents the history of the EDGE (Early Development of General Engineering) Summer Bridge Program that was initiated in 2003, and focuses on the most recent iteration of the program. Over its history this project has been supported by grants from our local college Foundation, the National Science Foundation, and the Department of Education.

After sustained efforts to create a stable program based on the original concept did not provide the desired results, a comprehensive examination and redesign of the program was conducted for 2013. The new version has been developed as a two year program. The first year would prepare students for College Algebra by boosting their Math proficiency and helping them acquire a strong college student identity. The second year would introduce them to college level Engineering.

The new edition of the program was offered for the first time in 2013 with only the first year component. In 2014 we offered both components and made them available for returning students as well as the new ones. The robotics project, which had become very popular with students, was refined and diversified to include two sequential years of activities and challenges. This enhancement provided increased opportunity for our students to diversify their design and programming skills.

The paper presents and analyzes the results of the second year of the new edition of the program and describes the long term plans to continue the program with support from other funding sources.

### **Brief History of the Program**

The EDGE Program was started in 2003<sup>1</sup> and initially was intended to continue the work started in the established San Antonio Pre-freshman Engineering Program (PREP)<sup>2</sup> with a more intense focus on the Engineering profession. From the beginning its stated mission was: “The Early Development of General Engineering (EDGE) Program is designed to increase high school students’ awareness of various engineering fields and sustain their interest in the study of engineering. We recognize that Math is critical in the field of engineering; therefore, our program focuses on increasing students’ math abilities so they leave our program with the knowledge, skills, and confidence that will prepare them for successful engineering careers.”

Despite the excellent reviews our program received from students, parents, and teachers, the expected enrollment numbers did not materialize as expected and the following years brought changes and new developments designed to adapt the program to the needs of a different student population than it was originally intended for.<sup>3, 4, 5, 6, 7</sup>

Every year the goal has been to enroll approximately 50 students in two parallel sections. Since the program was initiated in 2003, there have only been two years when we had more than one section. Since the desired student numbers did not materialize, we began making changes that we thought would make the program more appealing without sacrificing rigor. The greatest challenge has consistently been to find a way to accommodate students who were interested in the program but not prepared for College Algebra. The next program iterations included

Introduction to Computing and then Introductory Physics as substitutes, along with self-paced computer-based math enrichment programs such as Plato. The substitute courses did not provide transferable credits (for STEM degrees) however, and as enrollments remained flat we continued to seek new program innovations. One of the annual modifications that turned out to be very popular was a robotics project. This element has become a permanent fixture of the program.

During this period a multitude of engineering summer bridge programs were introduced in almost every school across the country and in our area<sup>8,9,10,11</sup>. The students had multiple choices to spend their summers and enrollment reflected these competing options.

Since inception the overall mission of the program has remained the same while specific components have been transformed to reflect the changing needs of our student population.

A brief review of the academic accomplishments of participating students in previous EDGE programs as reported by National Student Clearinghouse in December 2014 is shown in Table 1.

Education Level	Enrolled in EDGE	Not in Records	Enrolled in a 2 Year College	Graduated with Associate Degrees	Enrolled in a 4 Year University	Graduated with a Bachelor's Degree	Graduated with a Master's Degree
# Students	283	19	79 (30%)	32 (11%)	88 (31%)	70 (25%)	7 (2.5%)

**Table 1.** Academic Accomplishments of Past EDGE Students

The 19 students that were unaccounted for are considered to be out of the system or still in high school. Of all the students that were still enrolled or had obtained a degree, 64% of them were in a technical field. The numbers do not necessarily add up because several students earned more than one degree, or after earning their associate transferred to a 4-year institution.

### Changes made in 2014

The configuration of the EDGE 2014 Program was finalized as follows. The first year component (EDGE 1) was offered to all students that applied for the first time to the EDGE program and were entering high school grades 10, 11, and 12. They were enrolled in the appropriate math course following the recommendations of the new TSI<sup>12</sup> assessment test that replaced the old Accuplacer test. The lowest level of Math for accepted students was established at Elementary Algebra. EDGE students at the Intermediate Algebra developmental math levels were placed in an online ALEKS<sup>13</sup>-based class with a supervising EDGE faculty member, who is also a math instructor. Students that qualified for college level math were enrolled in regular Summer session math classes with non-EDGE college students. Once the math classes were over, the students returned to the other scheduled Year-1 activities that included a student development class (SDEV).

The second year component (EDGE 2) was offered to all returning students from the first year of the previous EDGE 1 (2013), and to new students that graduated from high school and were ready for college. The returning EDGE students were enrolled in the math course that followed the one they passed in the previous EDGE year. The new high school graduates were enrolled in

the math course recommended by their TSI assessment scores. Those that had graduated from high school but tested at a math level below college algebra were placed in EDGE 1. The EDGE 2 students that qualified for college level math courses were enrolled in regular Summer math classes with other non-EDGE college students. Once the math classes were over, the students returned to the other scheduled Year-2 activities that included an Intro to Engineering class and a more advanced robotics activity.

For 2014 new field trips were planned for both groups of students, and were planned for alternate sites from the previous year in order to provide the EDGE students from both years with new experiences.

The range of math course levels and STEM activities developed for the EDGE 2014 year one and two is shown below:

<u>EDGE 1</u>	<u>EDGE 2</u>
<ul style="list-style-type: none"> <li>• MATH               <ul style="list-style-type: none"> <li>• Elementary Algebra</li> <li>• Intermediate Algebra</li> <li>• College Algebra</li> <li>• Pre-calculus</li> <li>• Calculus I</li> <li>• Calculus II</li> </ul> </li> <li>• SDEV</li> <li>• STEM Activities</li> </ul>	<ul style="list-style-type: none"> <li>• MATH               <ul style="list-style-type: none"> <li>• Elementary Algebra</li> <li>• Intermediate Algebra</li> <li>• College Algebra</li> <li>• Pre-calculus</li> <li>• Calculus I</li> <li>• Calculus II</li> </ul> </li> <li>• Intro to Engineering</li> <li>• Advanced STEM (Robotics) Activity</li> </ul>
	<ul style="list-style-type: none"> <li>• Joint Field Trips</li> </ul>

The new approach, first used in 2013, to introduce students to the Engineering profession while building mathematics skills, was expanded with the year two of the program. We made a deliberate effort to minimize the time spent by the students in remedial math, while at the same time, attempting to bring to life the use of Math in the real world, particularly in engineering applications. Our aim is to dispel the proverbial “fear of Math” by demonstrating the intrinsic connection of Math with everyday problems, showing students how engineers use Math to solve these problems. Our hope is that they will discover the beauty of the engineering profession, and will be stimulated to seek out more information to choose the field of Engineering that best matches their interests. Our instructional approach is based on research on effective Engineering instruction<sup>14</sup>.

We maintained a commitment to involve the Math department early in the planning process so we could tailor the math courses to fit the needs of the applying students. As a result, the 2014 iteration of our EDGE program had the following organization:

Students were admitted to the EDGE program based on their TSI scores;

- Low group – score below 342 (Math 0310 – Elementary Algebra)
- Medium group – score between 343 and 349 (Math 0320 – Intermediate Algebra)

Low and medium group students were placed in the EDGE developmental math program (3 hours/day) using ALEKS, the online math assessment and learning system. The supervising professor created objectives in ALEKS for the developmental math program that included: Pre-Algebra, Geometry, Measurements, Elementary Algebra (Math 0310), and Intermediate Algebra (Math 0320). In addition, a separate ALEKS course was developed for College Algebra (Math 1414) to allow students who completed the developmental math program to continue into College Algebra using ALEKS. The syllabi for both ALEKS courses are presented in Appendix 3 and 4.

- High group – score above 349 (college level math courses)

These students were enrolled in the appropriate college level courses along with regular college students.

## Results

As in previous years the recruiting team set up a schedule to participate in many high school functions in our area. In total there were three visits to the local Education Service Center and another to one of our Independent School Districts to meet high school science and math teachers, fifteen high school career night visits, two youth conferences, and multiple classroom presentations to advertise our program. In some of the school events volunteers from our MESA Program participated as well to communicate directly with high school students to discuss engineering careers and the EDGE program. These efforts resulted in a final enrollment to 28 students, the demographics of which are presented in Tables 2 and 3 below.

Grade Level	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>	Total
# Students Enrolled	2	17	7	2	28

**Table 2.** Total Enrollment by Grade Level for EDGE 2014

Students Enrolled	Female	Male	Hispanic	White	Return Students
28	13	15	25	3	6

**Table 3.** Enrollment Demographics for EDGE 2014

The distribution of students among the program components is shown in Tables 4 and 5. The Student Development class had 22 EDGE 1 students enrolled. The Intro to Engineering class had 6 EDGE 2 students enrolled along with regular college students.

	<b>Math 0310/0320</b>	<b>Math 1414 College Algebra (Pre-Calculus track)</b>	<b>Math 2414 Calculus II</b>
<b># Students Enrolled (EDGE 1)</b>	<b>14</b>	<b>8</b>	<b>-</b>
<b># Students Enrolled (EDGE 2)</b>	<b>4</b>	<b>1</b>	<b>1</b>
<b># Students earned Productive Grade credit</b>	<b>16* (4-A; 5-B; 7-C)</b>	<b>7* (2-A; 3-B; 2-C)</b>	<b>1 (1-A)</b>

**Table 4.** Math Enrollment EDGE SU 2014 (\*One student earned credit in two Math classes)

	<b>SDEV</b>	<b>ENGR 1201</b>
<b># Students Enrolled</b>	<b>22</b>	<b>6</b>
# Students Completed Course with an “A”	18	1
# Students Completed Course with a “B”	3	5
# Students Completed Course with a “C”	1	-
<b>Total # of students who earned credit for SDEV</b>	<b>22</b>	<b>6</b>

**Table 5.** Student SDEV and ENGR 1201 Enrollment EDGE SU 2014

The EDGE 2014 program maintained the four field trips formula that seems to fit our schedule very well. This year the field trips included Blue Wing Solar Farm, Southwest Research Institute, Waste Management and Recycling Company Republic Services, and HEB San Antonio Retail Support Center. The field trips continued to provide opportunities for our students to interact with the engineers and technicians working in those companies and helped them to gain an insight of what kind of work they can expect to perform if they graduate with a degree in engineering.

The STEM activities planned as team activities and for EDGE Year One students included “Paper Skyscraper & Straw Rocket Project”, “Circuits Lab Basics and Algebra Circuits Labs”, “Fuel/Solar Cell Cars”, “Air-launched Rockets”, “Geometry Puzzles & Geometry Shapes Activities”, “Gyroscope Modular Origami Dodecahedron Activity”, and “Sumobot Robotics Competition”. They were in general well received and being team oriented activities they helped the students expand their cooperation and teamwork skills.

The EDGE Year Two students were involved in the three projects included in Intro to Engineering class that was followed by an “Advanced Robotics/Lego Mindstorms & Tetrix Project” afterwards. Their responses indicate that they found these activities worthwhile as well.

During the afternoon activities several STEM presentations were scheduled in the MESA Center. Some of them were made by STEM professionals to describe to EDGE students their work and help them make the connection between school classes and the real life of an engineering career. Other presentations were made by other STEM students involved in our own undergraduate research program describing their work and providing insights into various STEM projects that were going on at the same time.

## **Conclusions**

The data and responses from the EDGE 2014 program give us the confidence that we finally found the formula that works and provides multiple benefits for the students such as:

- It is effective in improving students’ proficiency in Math regardless of their entry level
- It exposes them to activities where Math is applied in everyday situations
- It exposes students to various Engineering activities and helps them decide what field of Engineering to explore further
- By enrolling these students in college while in high school and granting them real credit hours, the program provides them with a sense of accomplishment and pride. For many of them it is the proof that they can achieve a college education
- The field trips introduce them to real working places where they can see how many things they can accomplish with an Engineering degree

The fact that we began receiving program inquiries from parents in December 2014 to inquire about our EDGE 2015 program demonstrates that the community has started to realize the value that our EDGE program provides.

Appendix 1 shows the results of the final survey from year one students in which the students were asked to evaluate the entire program as well as each activity associated with it. Appendix 2 shows the results of the final survey from year two students.

Appendix 3 and 4 show the new ALEKS Course Objectives developed by our faculty specifically for the EDGE Program. The syllabi, due to their length, can be reviewed on the EDGE Program website.

As in previous years, we remain indebted to the members of our EDGE Executive Team, the program faculty, and our college administration. Their participation and support has enabled us to continue offering this program, and to make continuing improvements to help increase the number of high school students entering college with the intention and capability of achieving a degree in Engineering, Science, or Mathematics.

### References:

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12. TSI Assessment Testing, URL: < [http://www.scottjwarren.com/drc/TSI\\_Information.html](http://www.scottjwarren.com/drc/TSI_Information.html) >
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## Appendix 1

### 2014 EDGE – Year One: Final Student Survey – Summary of Results

Survey Date: 16 July 2014

Students Completing Survey: 20 Year 1 Students

#### A: Multiple Choice Statements/Questions:

#	Survey Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I am knowledgeable about the EDGE Program.	12	8	0	0	0
2	I am knowledgeable about college life.	8	8	4	0	0
3	I am knowledgeable about the engineering profession.	5	10	5	0	0
4	I am interested in an engineering career.	6	6	5	2	1
5	I am good at math.	5	13	2	0	0
6	I am good at science.	4	12	3	1	0

#### B: Yes/No Statements & Questions:

#	Survey Statement	Yes	No
7	Will you recommend the EDGE Program to other students?	19	1
11	Did you gain what you wanted from this program?	20	0
12	Were the EDGE Program courses well-coordinated and interconnected?	20	0

#### C: Multiple Choice Statements/Questions:

#	Survey Statement	Definitely	Highly Probable	Maybe	Not Likely	Under No circumstances
8	If it is offered will you participate in the Fall semester Edge Program?	7	5	5	2	1
9	If it is offered next summer, will you enroll in a second year EDGE program?	8	4	6	2	0

#### D: Summary of Responses to Statements/Questions That Required Written Comments 10 - 17:

#	Survey Statement	Responses
10	<b>What did you want to gain from the edge program?</b>	
	Better knowledge of engineering/engineering profession/work/opportunities	9
	Knowledge in Math	8
	Learn about college life/how to succeed in college/college credit	3
13	<b>Which activities, subjects, or courses would you like to see included in the program?</b>	
	More science/physics based material	7
	No answer	4
	More Hands on material	3
	More Sumobot use	2
	More math/engineering based material	1
	More ALEKS use	1
	Enjoyed current program	1

<b>14</b>	<b>What did you like about the EDGE program?</b>	
	The Math and Engineering aspect	5
	Learning new material/information	4
	Group collaboration/Group competitions/Working with like-minded students	3
	No Answer	3
	Friday Trips	2
	ALEKS	1
	Robots	1
	Hands on activities	1
<b>15</b>	<b>What did you not like about the EDGE program?</b>	
	No Answer	5
	Too much math/too rigorous	4
	ALEKS	3
	Not enough help/support/instructor	3
	Not enough preparation/background before starting activity	2
	Too little science based material	1
	Too much computer use	1
	Circuit Activity	1
<b>16</b>	<b>What did you like about your instructors?</b>	
	Good attitude/helpful	14
	Effective and Efficient teaching style	4
	Related activities to engineering and real world use	2
<b>17</b>	<b>What did you not like about your instructors?</b>	
	No complaints	9
	No Answer	6
	Attitude/Not helpful	3
	Instructors were rarely present	1
	Lack of training on activity material	1

**E: Multiple Choice Statements/Questions:**

#	Survey Statement	Strongly Agree	Agree	Disagree
<b>18a</b>	The Paper Skyscraper & Straw Rocket activity was worthwhile to me.	5	12	3
<b>18b</b>	The Circuits Lab Basics and Algebra Circuits Labs were worthwhile to me.	2	16	2
<b>18c</b>	The Fuel/Solar Cell Car activity was worthwhile to me.	12	8	0

<b>18d</b>	The Air-Launched Rocket activity was worthwhile to me.	12	7	1
<b>18e</b>	The Geometry Puzzles & Geometry Shapes activities were worthwhile to me.	7	13	0
<b>18f</b>	The Gyroscope Modular Origami Dodecahedron activity was worthwhile to me.	8	10	2
<b>18g</b>	The Robotics (Sumobot) activity was worthwhile to me.	17	2	1
<ul style="list-style-type: none"> <li>18a (1) found it confusing, (1) thought it was too little time, all other 18 Disagrees did not given reason why, or left too vague answer</li> </ul>				
<b>19a</b>	The SwRI professional engineer speaker session, that provided information on the INMS Cassini Satellite currently orbiting Saturn, was worthwhile.	11	9	0
<b>19b</b>	The MESA and SAC Opportunities session, where Analisa Sengele provided information on the MESA Center, undergraduate research projects, student organizations, and internships was worthwhile to me.	8	12	0
<b>19c</b>	The San Antonio River Authority (SARA) professional engineer speaker session was worthwhile to me.	10	10	0
<b>19d</b>	The CPS Energy professional engineer speaker session was worthwhile to me.	6	12	2
<ul style="list-style-type: none"> <li>No reasons given for Disagreements</li> </ul>				
<b>21a</b>	I prefer to learn math online using ALEKS over traditional math (lecture) class.	5	13	2
<b>21b</b>	The tutors and instructors were helpful in learning math using ALEKS.	9	11	0
<b>21c</b>	I learn math faster using ALEKS (with tutor/instructor help) than in a traditional math class.	6	13	1
<b>21d</b>	I learned more math than I expected during the EDGE program.	10	8	2
<ul style="list-style-type: none"> <li>21a (1) Disagreement said they preferred being able to interact with professor. No other reasons given</li> </ul>				

**F: STEM activities ranking from most enjoyable (1) to least (7):**

<b>18h</b>	<b>Survey Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
	Paper Skyscraper & Star Rocket	0	27%	9%	18%	18%	9%	18%
	Electric Circuits Labs	0	0	0	27%	9%	45%	18%
	Fuel Cell Car	18%	45%	18%	18%	9%	0	0
	Air-Launched Rockets	9%	18%	45%	9%	9%	0	9%
	Geometry Puzzles & Geometry Shapes	0	18%	9%	0	36%	18%	18%
	Gyroscope Modular Origami Dodecahedron	0	9%	18%	45%	9%	9%	9%
	Robotics (Sumobot)	82%	0	9%	0	0	9%	0

- (9) surveys were unusable due to error in filling out information, only (11) surveys used

**G: STEM activities ranking from most enjoyable (1) to least (4):**

<b>19e</b>	<b>STEM Presentations</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	SwRI professional engineer	100%	0	0	0
	MESA and SAC Opportunities	0	50%	10%	40%
	SARA professional engineer speaker	0	30%	70%	0
	CPS Energy professional engineer speaker	0	20%	20%	60%

- (10) surveys were unusable due to error in filling out information, only (10) surveys used

**H: STEM activities ranking from most enjoyable (1) to least (4):**

20a	EDGE Field Trips	1	2	3	4
	CPS Energy Blue Wing Solar Farm	0	18%	9%	73%
	South West Research Institute Metering & Fire Science	36%	18%	36%	9%
	Republic Services Waste Management	18%	27%	45%	18%
	HEB Meat and Ice Cream Factories	55%	36%	9%	0

- (9) surveys were unusable due to error in filling out information, only (11) surveys used

**I: Summary of Responses to Statements/Questions Requiring Written Comments 18 - 21:**

#	Survey Statement	Responses
<b>18h</b>	<b>For your favorite hands-on STEM activity, explain why you ranked it first.</b>	
	Accomplishment/Fun/Expanding knowledge	5
	Team building/Bonding aspect	2
	Programming and building	6
	Influence on career/academic path	1
	No/Vague Answer	6
<b>18i</b>	<b>For your least favorite hands-on STEM activity, explain why you ranked it last.</b>	
	Too difficult/ /too much info	9
	Subject interest	1
	Too much time	1
	Too similar to other projects	2
	No/Vague Answer	7
<b>19f</b>	<b>For your favorite STEM presentation, explain why you ranked it first.</b>	
	Stimulating/ Fun	2
	Field & Career insightful/ Personal Interest	7
	Presentation/Presenter	4
	No Answer/ Vague	7
	<ul style="list-style-type: none"> <li>• (3) Students felt the background of the presenter (gender) and their passion for their field played an important role for them</li> </ul>	
<b>19g</b>	<b>For your least favorite STEM presentation, explain why you ranked it last.</b>	
	Too Short/Confusing Material/ Poor Presentation	6
	The presentation subject was not interesting/ No invested interest	8
	No/Vague Answer	6
	<ul style="list-style-type: none"> <li>• One student said the poor presentation was due to too much noise (MESA Center)</li> </ul>	
<b>20b</b>	<b>Why did you rank the most enjoyable field trip first?</b>	
	Stimulating/Fun/ Interesting presentation	4
	Rewards (treats/swag)	5
	Learning about career opportunities/ Job responsibilities	7
	No Answer/Vague	4
<b>20c</b>	<b>Why did you rank your least favorite field trip last?</b>	
	Too short/poor presentation	2
	Environmental Conditions (heat/bugs)	4
	Not interesting subjects	7
	No Answer/ Vague	8

<b>21e</b>	<b>What did you like most about the ALEKS EDGE Math Program?</b>	
	Solidified knowledge/ learned new material	8
	Pace/efficient	7
	Home access	1
	No/Vague Answer	4
<b>21f</b>	<b>What did you like least about the ALEKS EDGE Math Program?</b>	
	Time Consuming/Overwhelming	4
	Professor (Teaching Style/Attitude)	2
	Too much computer use	2
	No/Vague Answer	12

## Appendix 2

### 2014 EDGE – Year Two: Final Student Survey – Summary of Results

Survey Date: 16 Jul 2014

Students Completing Survey: 6

Year 2 Students

#### A. Multiple Choice Statements/Questions:

#	Survey Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I am knowledgeable about the EDGE Program.	6	0	0	0	0
2	I am knowledgeable about college life.	5	1	0	0	0
3	I am knowledgeable about the engineering profession.	4	2	0	0	0
4	I am interested in an engineering career.	0	0	0	0	0
5	I am good at math.	1	4	1	0	0
6	I am good at science.	2	4	0	0	0

#### B. Yes/No Statements/Questions:

#	Survey Statement	Yes	No
7	Will you recommend the EDGE Program to other students?	6	0
9	Did you gain what you wanted from this program?	6	0
10	Were the EDGE Program courses well-coordinated and interconnected?	6	0

#### C. ENGR 1201 Team Projects Statements:

#	Survey Statement	Strongly	Agree	Disagree	No answer
18a	Advanced Robotics/ Lego Mindstorms & Tetrix	1	4	0	1
19a	SwRI professional engineer speaker session	3	3	0	0
19b	MESA/SAC opportunities session	1	5	0	0
19c	San Antonio River Authority (SARA) engineer	1	5	0	0
19d	CPS Energy engineer speaker	1	5	0	0
21a	ALEKS over Traditional MATH	0	4	0	2
21b	Tutors and Instructors Helpful for ALEKS	0	4	0	2
21c	Learn math faster with ALEKS than traditional class	2	2	0	2
21d	Learned more math than expected	1	4	0	1

- One student answered N/A for 21a-21c still strongly agreed with 21d

### 19e. STEM Presentation Ranking

Rank:	1 (Most Enjoyable)	2	3	4 (Least Enjoyable)
SwRI professionals engineer speaker	4	1	0	0
MESA and SAC Opportunities	1	3	1	0
SARA professional engineer speaker	2	0	1	2
CPS Energy professional engineer speaker	0	1	3	1

- Of 6 students surveyed, only 5 answered

### 20a.EDGE Field Trips Ranking

Rank:	1 (Most Enjoyable)	2	3	4 (Least Enjoyable)
CPS Energy Farm	0	2	2	1
SwRI Metering & Fire	5	0	0	0
Republic Services Waste Mgmt.	0	1	2	2
HEB Meat & Ice Cream	0	2	0	2

- Of 6 students surveyed, only 5 answered, one student did not attend HEB factory so did not rank it.

### D. Summary of Responses to Statements/Questions That Required Written Comments:

#	Survey Statement	Responses
<b>8</b>	<b>What did you want to gain from the EDGE Program?</b>	
	Knowledge in Math	1 – 12.55%
	Quick view of/basic feel for/better knowledge of engineering/engineering profession/work/opportunities	4 – 50%
	Learn about college life/how to succeed in college/college credit	3 – 37.5%
	<ul style="list-style-type: none"> <li>• 3 students gave multiple EDGE program desires</li> </ul>	
<b>11</b>	<b>Which activities, subjects, or courses would you like to see included in the program?</b>	
	Math	1
	Science	1
	<ul style="list-style-type: none"> <li>• 4 students did not give answers</li> </ul>	
<b>12</b>	<b>What did you like about the EDGE Program?</b>	
	Math	2
	Additional Projects	1
	Engineering Course	2
	<ul style="list-style-type: none"> <li>• 1 student did not answer</li> </ul>	
<b>13</b>	<b>What did you not like about the EDGE Program?</b>	
	Nothing	4
	Lots of worksheets/short time period to work on assignments/short time per topic	3
<b>16</b>	<b>What did you like about your instructors?</b>	
	Helpful/Involvement	2
	Were detailed and specific/good explanation/knowledgeable	1
	<ul style="list-style-type: none"> <li>• 3 students answers were too vague or did not answer Ex: Everything</li> </ul>	

<b>17</b>	<b>What did you not like about your instructors?</b>	
	Nothing	6
<b>18b</b>	<b>Please provide suggestions on how to improve the Year 2 STEM hands-on activity.</b>	
	Nothing	4
	More Time	1
	Clearer Instructions	1
<b>19f</b>	<b>For your favorite STEM presentation, explain why you ranked it first.</b>	
	Found Most interesting * did not answer what was specifically interesting	2
	Abundance of opportunities	1
	Well informed	2
	No Answer	1
<b>19g</b>	<b>For your least favorite STEM presentation, explain why you ranked it last.</b>	
	Did not attend	1*
	Not informative	1
	No Answer	4
	<ul style="list-style-type: none"> <li>* the student who marked SARA speaker as their least favorite due to not attending, felt the CPS energy speaker was their least favorite of attended presentations</li> </ul>	
<b>20b</b>	<b>For your favorite Field Trip, explain why you ranked it first.</b>	
	Invested interest in field/Personal Ties	1
	Stimulating tour	4
	No Answer/Vague answer	1
<b>20c</b>	<b>For your least favorite trip, explain why you ranked it last.</b>	
	Did not like environmental setting	1
	Information was not stimulating	2
	No answer/Vague Answer/ Did not Attend	2*
	Poor presentation	1
	<ul style="list-style-type: none"> <li>* One student who marked HEB as their least favorite due to not attending felt the CPS energy farm was their least favorite of attended field trips.</li> </ul>	
<b>21e</b>	<b>What did you like the most about the ALEKS EDGE Math Program</b>	
	Self-paced	3
	No Answer	2
	The subject mater	1
<b>21f</b>	<b>What did you like the least about the ALEKS EDGE Math Program</b>	
	Not enough time	1
	Did not answer	4
	Repeating the program	1

## Appendix 3

### 2014 EDGE - ALEKS Developmental Math Syllabus

# ALEKS<sup>®</sup> Course Syllabus

<b>Course Name:</b> Fall MATH 0305-0310-0320 &ndash; EDGE	<b>Course Code:</b> UJFFH-JHKPF
<b>ALEKS Course:</b> Pre-Algebra and Introductory Algebra	<b>Instructor:</b> Prof. Bartels
<b>Course Dates:</b> Begin: 06/09/2014 End: 07/20/2014	<b>Course Content:</b> 642 topics
<b>Textbook:</b> Miller/O'Neill/Hyde: Prealgebra and Introductory Algebra, 1st Ed. (McGraw Hill, Paperback) - ALEKS 360	

Objectives Covered	Mastery Level
1. 0305 Whole Numbers	80%
2. 0305 Integers	80%
3. 0305 Fractions	80%
4. 0305 Decimals & Percent	80%
5. 0305 Geometry & Stats	80%
6. 0310 Linear Equations	80%
7. 0310 Linear Graphs	80%
8. 0310 Linear Systems	80%
9. 0310 Exponents	80%
10. 0310 Polynomials	80%
11. 0320 Quadratics	80%
12. 0320 Rationals	80%
13. 0320 Radicals/Quadratics	80%
14. 0320 Functions & Graphs	80%

A student must meet the Mastery Level percent for each Objective in order to move on to the next Objective. For example, if a Mastery Level is set at 90% for the first Objective, students must score 90% or higher in order to move on to the second Objective. The final day that Objectives can be completed is 07/16/14.

The entire syllabus content can be reviewed on the EDGE Program website:

< <http://www.alamo.edu/sac/edge/> >



## Appendix 4

### 2014 EDGE - ALEKS Math 1414 (College Algebra) Syllabus

# ALEKS<sup>®</sup> Course Syllabus

<b>Course Name:</b> Math 1414 &ndash; EDGE	<b>Course Code:</b> 3YMNG-N3NMU
<b>ALEKS Course:</b> Texas DMAT 0093-MATH 1314	<b>Instructor:</b> Prof. Bartels
<b>Course Dates:</b> Begin: 06/09/2014 End: 07/20/2014	<b>Course Content:</b> 219 topics
<b>Textbook:</b> Miller/O'Neill/Hyde: Intermediate Algebra and College Algebra, 1st Ed. (McGraw-Hill) - ALEKS 360	

Objectives Covered	Mastery Level
1. Part 1: 7-Quadratic Equations, Functions, and Inequalities	80%
2. Part 2: 2-Functions and Graphs	80%
3. Part 2: 3-Polynomial and Rational Functions	80%
4. Part 2: 4-Exponential and Logarithmic Functions	80%
5. Part 2: 6-Matrices and Determinants and Applications	80%
6. Part 2: 8-Sequences, Series, Induction, and Probability	80%

A student must meet the Mastery Level percent for each Objective in order to move on to the next Objective. For example, if a Mastery Level is set at 90% for the first Objective, students must score 90% or higher in order to move on to the second Objective. The final day that Objectives can be completed is 07/16/14.

The entire syllabus content can be reviewed on the EDGE Program website:

< <http://www.alamo.edu/sac/edge/> >