

## 2010-2011 Annual Academic Program Assessment Report

<b>Academic Program:</b>	A.S. Mathematics
<b>Academic Program Division:</b>	Science, Math and Engineering
<b>Program Responsible Person:</b>	Richard Arrigotti
<b>Assessment Team Member/s:</b>	Jeff Downs, Jim Strange, Mike Hardie, Scott Morrison, Rich Arrigotti, Gary Schwartz
<b>Date Submitted:</b>	May, 2011
<b>College Strategic Plan Goals:</b>	<ol style="list-style-type: none"> <li>1. Improve student success in program completion and graduation rates.</li> <li>2. Ensure institutional excellence in teaching, programs and services.</li> <li>3. Embrace our college's many communities and respond to their diverse needs.</li> </ol>
<b>Division Mission:</b>	<ul style="list-style-type: none"> <li>○ To prepare students to succeed in college-level science, math and engineering courses.</li> <li>○ To prepare students to transfer to 4-year colleges.</li> <li>○ To provide students with the knowledge they need in their careers.</li> <li>○ To provide students with opportunities for personal enrichment</li> </ul>
<b>Program Mission:</b>	Provide the academic knowledge and skills for successful transfer to meet higher educational goals.

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## Outcome #1

<b>Program Goal:</b>	By providing students with mathematical knowledge, WNC AS Math graduates will grow intellectually and have the ability to more easily integrate and develop technological advances into their academic and professional lives.
<b>Outcome:</b>	<p>Students who complete an AS Math degree are expected to:</p> <ol style="list-style-type: none"> <li>1. understand the content of calculus and differential equations;</li> <li>2. succeed at their transfer institutions.</li> </ol>
<b>Assessment Methods and Criteria for Success:</b>	<ol style="list-style-type: none"> <li>1. Imbed common questions into exams for sections of Calculus I, II, III, and Differential Equations;</li> <li>2. Track AS Math graduates BA/BS completion from Spring, 2006 through Spring, 2007.</li> </ol>
<b>Planned Use of Results:</b>	The department members will meet at the beginning of the Fall/10 semester to develop the common questions. The department will meet at the conclusion of the 2010-2011 year to share and discuss results.

## OUTCOME I

### RESULTS OF COMMON IMBEDDED QUESTIONS ON EXAMS, FALL 2010 AND SPRING 2011

#### MATH 181, CALCULUS I

1. Find the equation of the tangent line to ...

Three sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

$$43/89 = 48\%$$

2. Find the area of the region bounded by the graph of ...

Five sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

$$51/71 = 72\%$$

#### MATH 182, CALCULUS II

1. Find the volume of the solid generated by revolving the region bounded by ...

Two sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

$$51/57 = 89\%$$

2. Using partial fractions, find the integral of ...

Two sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

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38/50 = 76%

## **MATH 283, CALCULUS III**

1. Find the rate of change of ... at the point  $(-2, 3)$  in the direction of the vector  $v = \langle 1, 5 \rangle$ .

Two sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

28/34 = 82%

2. Find the volume of the solid bounded by the graphs of the equations ...

Two sections reported the following ratio (number of correct responses or with slight error) / (total number of responses)

25/34 = 74%

## **MATH 285, DIFFERENTIAL EQUATIONS**

1. A tank initially contains 600 gallons of beer at 4% alcohol. Beer containing 7% alcohol begins to flow into the tank at the rate of 4 gal/min. The well-stirred mixture flows out at a rate of 6 gal/min. How many gallons of alcohol are in the tank 45 minutes later?

One section reported the following ratio (number of correct responses or with slight error) / (total number of responses)

21/35 = 60%

2. A mass of 1.5 kg hanging from a ceiling stretches a spring 0.49 m on coming to rest at equilibrium. The damping constant for the system is 12 N-sec/m. If the mass is raised 0.75 m above the equilibrium position and released, find the equation of motion, damping factor, and when the mass will first return to its equilibrium position.

One section reported the following ratio (number of correct responses or with slight error) / (total number of responses)

27/32 = 84%

**Conclusion:** Data indicates a significant majority of the students are learning the material.

In addition to imbedding common questions in the higher level math courses, three common questions were also imbedded in three sections of Math 120. The results follow.

## **MATH 120, FUNDAMENTALS OF COLLEGE MATHEMATICS**

1. a. \$20,000 is invested at an annual percentage rate of 4.5% compounded quarterly. How much is the investment worth after 8 years?  
b. How much interest has accrued at the end of the 8 years?

Three sections reported the following ratios (number of correct responses) / (total number of responses)

38/54 = 70%

2. A bag contains 5 green marbles, 8 red marbles, and 12 blue marbles. Five marbles are drawn from the bag without replacement. Find the probability of drawing 2 red marbles and 3 blue marbles.

Three sections reported the following ratios (number of correct responses) / (total number of responses)

40/57 = 70%

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3. The life span of Acme tires is normally distributed with a mean of 40,000 miles and a standard deviation of 3,500 miles. Find the probability that an Acme tire will last 45,000 miles or more. Three sections reported the following ratios (number of correct responses) / (total number of responses)  $37/54 = 67\%$

**Conclusion:** Again the data indicates a significant majority of the students are learning the material.

### **OUTCOME 2**

Number of WNC AS-MAT (Mathematics Emphasis) graduates from Spring 2006 – Fall 2007: 21

How many of these of these students transferred to a 4 year institution: 13

How many of these students completed a bachelor's degree and in what major: 10

- B.S - Mathematics (Applied)
- B.S - Electrical Engineering
- B.A - Anthropology
- B.S - Mechanical Engineering
- B.S - Civil Engineering, M.S -Civil And Environmental Engineering
- B.A - Psychology
- B.S - Civil Engineering
- B.S - Biology
- B.S - Environmental Engineering
- B.S - Civil Engineering

**Conclusion:** Data indicates WNC AS-MAT (Mathematics Emphasis) graduates are succeeding at their transfer institutions.