

Academic Affairs & Standards Committee
June 25, 2014 9-10:30 am
EGF 149 TRF 601

Present: Kathy Huschle, Jim Retka, Brian Huschle, Mary Fontes, Andy Mueller, Rocky Ammerman,, Karl Ohrn, Don Fischer, Jack Haymond, Kari Koenig, Carey Castle, Erin Almlie, Tishara Melcher, Kate Schmalenberg
Absent: Curtis Zoller, Brian Suckow

Approval of Minutes

The May minutes were approved as recorded.

Program Changes

| Vote | Programs | Discussion |
|------|----------|------------|
| | | |

Course Changes

| Vote | Course | Discussion |
|----------|---|---|
| Tabled | AUBO 1111, 1112, 2207, 2212 | ILO's updated – variable cr |
| Tabled | AVIA 1101, 1104, 1120, 1125, 2201, 2203, 2207, 2225 | ILO's updated |
| Tabled | SPTC 1111 Special Topics 3 cr 3/0/0 | New course old course IDST 1110 Learn2Learn |
| Approved | ENGL 0085 Reading & Writing II 3 cr 3/0/0 | Change name to Int Reading & Writing update learner outcomes |
| Approved | ENGL 0095 Reading & Writing III 3 cr 3/0/0 | Change name to Adv Reading & Writing |
| Approved | MATH 0090 Introductory Algebra 3 cr 3/0/0 | Update learner outcomes |
| Approved | MATH 1001 Technical Mathematics 3 cr 3/0/0 | Update learner outcomes |
| Approved | MATH 1003 Math Applications for Nurses 2 cr 2/0/0 | Update learner outcomes |

Program Specific Requirements (Standing Agenda Item)

None

Justification for College Level Courses

Based on studies completed by the English faculty group, the outcomes taught in ENGL 0075 Reading & Writing I were deemed to be below the 9th grade skill level.

Based on studies completed by the Math faculty group, the outcomes taught in MATH 0080 Math Foundations were deemed to be below the 9th grade skill level.

2014-15 Meeting Schedule

| Day | Date | Time | Location |
|-----------|---------|---------|-----------|
| Wednesday | Sept 3 | 2-5 pm | TRF 735 |
| Tuesday | Oct 7 | 1-4 pm | 149 / 601 |
| Wednesday | Nov 5 | 9-12 pm | 149 / 601 |
| Tuesday | Dec 2 | 9-12 pm | 149 / 601 |
| Tuesday | Jan 20 | 1-4 pm | 149 / 601 |
| Wednesday | Feb 4 | 1-4 pm | 149 / 601 |
| Tuesday | March 3 | 9-12 pm | 149 / 601 |
| Wednesday | April 8 | 9-12 pm | 149 / 601 |
| Tuesday | May 5 | 1-4 pm | EGF 290 |

MATH 0090 Introductory Algebra

LEARNING OUTCOMES FOR ADDRESSED:

1. Solve linear equations utilizing the order of operations. Linear equations and order of operations are essential review topics so that students are prepared for the upcoming material.
2. Simplify algebraic expressions and functions. **This meets the benchmark/description for 9.2.3.4.**
3. Solve equations and inequalities involving linear absolute values. Linear equations are addressed in 8.2.4.2 and linear inequalities are addressed in standard 8.2.4.5. However there is no mention of absolute value equations or absolute value inequalities in one variable (even using the search function.) **These topics are more advanced than the eighth-grade standards. Furthermore, standard 9.4.3.6 addresses the ideas of “and (intersection)” and “or (union)” which are concepts needed to solve linear absolute value inequalities.**
4. Solve mixture, investment, and uniform motion problems using linear equations. **This meets the benchmark/description for 9.2.2.1.**
5. Assess whether a solution is reasonable and interpret that solution in the context of the original problem. **This meets the benchmark/description for 9.2.4.8.**
6. Perform basic operations using polynomials, including addition, subtraction, multiplication, and division. **This meets the benchmark/description for 9.2.3.2.**
7. Apply the properties of exponents to simplify expressions. Standard 8.1.1.4 addresses properties of integer exponents; however it is only to generate equivalent numerical expressions. **Standard 9.2.3.6 addresses properties of rational exponents to generate equivalent algebraic expressions. In this course, properties of integer exponents are used to generate equivalent algebraic expressions (not just numerical.) This goes beyond the eighth-grade standard.**
8. Completely factor a polynomial using the rules of factoring. **This meets the benchmark/description for 9.2.3.3.**
9. Solve polynomial equations by factoring. **Solving quadratic equations by factoring meets the benchmark/description for 9.2.4.1.**
10. Expand binomial expressions raised to a power. **This is covered by benchmark 9.2.3.2 since it involves multiplying polynomials. It is college-level material which is beyond the basic operations that are covered in the high-school standards. (It is also a topic in most college algebra books.)**
11. Define a function and use function notation to evaluate a function at a given input value. **This meets the benchmark/description for 9.2.1.1.**
12. Distinguish between functions and other relations. **This meets the benchmark/description for 9.2.1.2.**

13. (ILO: 2) Employ creativity and effective problem-solving skills in a variety of mathematical contexts. **This is our institutional learning objective which encompasses the entire course. Benchmarks 9.2.4.1 and 9.2.4.8 are included.**

MATH 1001 Technical Mathematics

This course examines basic mathematical topics as they apply to the construction electricity program. As such, specific topics and applications will focus on the target audience. The course includes a review of basic mathematical operations, simple equations, and measurement conversions using the dimensional analysis method. It then continues with the development of algebraic and trigonometric skills as they apply to the construction electricity setting. Concepts are applied through program specific problems.

Strand: Geometry and Measurement (9, 10, 11)

Standard: Calculate measurements of plane and solid geometric figures, know that physical measurements depend on the choice of a unit and that they are approximations.

9.3.1.3 Benchmark: Understand that quantities associated with physical measurements must be assigned units; apply such units correctly in expressions, equations, and problem solutions that involve measurements; and convert between measurement systems. (The example given was use of dimensional analysis to convert 60 miles/hour to 88 feet/second.)

9.3.1.5 Benchmark: Make reasonable estimates and judgments about the accuracy of values resulting from calculations involving measurements. (The example given discussed the range of answers possible when rounding to the nearest tenth of a centimeter and calculating area of a rectangle.)

Standard: Solve real-world and mathematical geometric problems using algebraic methods.

9.3.4.2 Benchmark: Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios.

9.3.4.3 Benchmark: Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.

Strand: Algebra (9, 10, 11)

Standard: Recognize linear, quadratic, exponential and other common functions in real-world and mathematical situations; represent these functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions, and explain results in the original context.

9.2.2.2 Benchmark: Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth

9.2.2.3 Benchmark: Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.

Standard: Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.

9.2.3.1 Benchmark: Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.

LEARNING OUTCOMES

1. Express quantities as fractions and decimals and solve problems using basic operations on fractions and decimals.
2. Examine and solve problems involving percents, ratios, proportions, and direct and inverse relations.
3. Demonstrate scientific calculator skills.
4. Perform conversion within a measurement system, and conversion between different measurement systems using the dimensional analysis method.
5. Interpret and utilize basic rules of exponents and indices.
6. Perform algebraic and/or basic trigonometric operations which include sine wave graphing, defining vectors, and applying vectors.
7. Simplify and evaluate algebraic expressions, formulas, and equation by applying the order of operations as well as other basic algebraic manipulations.
8. Read and interpret labels, charts, and graphs.
9. Solve word problems by utilizing logical and critical thinking processes.
10. (ILO: 2) Employ creativity and effective problem-solving skills in a variety of mathematical contexts.

LEARNER OUTCOMES ADRESSED

This course emphasizes specific construction electricity related applications of several mathematical concepts. To be successful students must have an understanding of dimensional analysis, algebraic and trigonometric functions and applications, as well as a working knowledge of electrical quantities. As such, it meets or exceeds several of the Benchmarks put forward in the Minnesota Academic Standards for grades 9-11.

1. We spend a week or two reviewing how to express quantities as fractions and decimals, converting them back and forth, and then solving problems using basic operations on fractions and decimals.
2. We examine solve specific electrical quantity problems involving percents, ratios, proportions, and direct and inverse relations as they apply to, for example, series, parallel, and series-parallel resistive DC circuits, as well as capacitive and inductive circuits. Due to the program specific applications this meets or exceeds the **9.3.1.3 Benchmark**.
3. We do review basic scientific calculator skills as they apply to electrical calculations and applications. Meets or exceeds the **9.2.2.3 Benchmark**.
4. We do perform conversions within electrical measurement systems often using the dimensional analysis method. Meets or exceeds the **9.3.1.3 Benchmark**.
5. We interpret and utilize basic rules of exponents and indices as they apply to electrical quantities. For example, we review the rules of exponents as we utilize and manipulate Engineering notation. We also calculate gain or loss in decibels which involves an application of exponentials and logarithms. Meets or exceeds the **9.2.2.2 Benchmark**.
6. We perform algebraic and trigonometric operations as we calculate various electrical quantities and applications. These applications include sine wave graphing and defining vectors, as they apply to, for example, complex RC, RL, and RCL circuits. Due to the specific program applications this is college level, and exceeds the **9.3.4.2 Benchmark and 9.3.4.3 Benchmark**.

7. Simplify and evaluate algebraic expressions, formulas, and equation by applying the order of operations as well as other basic algebraic manipulations as they apply to specific electrical applications. Due to the specific applications this is college level, and exceeds the **9.3.1.3 Benchmark and 9.2.3.1 Benchmark**.
8. Read and interpret labels, charts, and graphs as they apply to electrical quantity problems. Meets or exceeds the **9.2.2.3 Benchmark**.
9. Solve word problems by utilizing logical and critical thinking processes. Due to the program specific applications this is college level.
10. (ILO: 2) Employ creativity and effective problem-solving skills in a variety of mathematical contexts. This is our institutional learning objective. It is a college-level objective since it involves applying the mathematical concepts specifically to the construction electricity program.

MATH 1003 Math Applications for Nurses

This course examines basic mathematical concepts as they apply to the Registered Nursing program. The course includes a review of mathematical operations, algebraic equations, and measurement conversions. Specific skills covered include feeding tube calculations, fluid replacement, intravenous drug calculations, and titration of medications. Prerequisites: Acceptance into a nursing program and completion of MATH 0080 with a "C" or better (or appropriate math assessment score).

Strand: Geometry and Measurement (9, 10, 11)

Standard: Calculate measurements of plane and solid geometric figures, know that physical measurements depend on the choice of a unit and that they are approximations.

9.3.1.3 Benchmark: Understand that quantities associated with physical measurements must be assigned units; apply such units correctly in expressions, equations, and problem solutions that involve measurements; and convert between measurement systems. (The example given was use of dimensional analysis to convert 60 miles/hour to 88 feet/second.)

9.3.1.5 Benchmark: Make reasonable estimates and judgments about the accuracy of values resulting from calculations involving measurements. (The example given discussed the range of answers possible when rounding to the nearest tenth of a centimeter and calculating area of a rectangle.)

Strand: Algebra (9, 10, 11)

Standard: Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.

9.2.3.1 Benchmark: Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.

LEARNING OUTCOMES (General)

1. Perform operations and conversions using fractions, decimals, percents, and ratios.
2. Solve proportions and other simple equations.
3. Compare and contrast units of measure in the metric and the household system.
4. Perform measurement conversions using dimensional analysis.
5. Convert between different measures of time and temperature.
6. Interpret drug orders.
7. Determine the quantities of solvent, solute, and solution relevant to reconstituting solutions.

8. Calculate oral and parenteral dosage of drugs.
9. Calculate intravenous dosages and flow rates.
10. Calculate dosages based on body weight and body surface area.
11. Determine safe pediatric dosages and daily ranges of drugs.
12. Solve nursing application problems by utilizing logical and critical thinking processes.
13. (ILO: 2) Employ creativity and effective problem-solving skills in a variety of mathematical contexts.

LEARNING OUTCOMES ADDRESSED

Our nursing leadership and the mathematics department prefer that this course is taught through the use of dimensional analysis. Dimensional analysis is clearly stated in 9.3.1.3 Benchmark. The 9.3.1.3 benchmark is the backbone of this course, because almost all of the calculations are done using this method. Students need to check their answers against estimates and also be aware of rounding and the inaccuracies associated with rounding, which incorporates 9.3.1.5 Benchmark. Also, the 9.2.3.1 Benchmark is utilized when a formula is evaluated.

1. We start the semester reviewing operations and conversions using fractions, decimals, percents, and ratios. This is a review of the basic arithmetic that students will need to handle both with and without a calculator.
2. This objective could easily be eliminated. The book contains information showing proportions and other simple equations but our dimensional analysis approach does not utilize this. (Many of the simple equations are merely evaluating one side, which is essentially 9.2.3.1 Benchmark.) Since some nursing instructors use these other methods, I acknowledge that the other methods exist and give students credit when they use them correctly. However, my teaching is based upon dimensional analysis. 9.3.1.3 Benchmark
3. Compare and contrast units of measure in the metric and the household system. There is a portion of this which is simply awareness of the measurements. The metric system is taught by moving the decimal point, although some students still prefer dimensional analysis. The household system conversions are taught using dimensional analysis. 9.3.1.3 Benchmark
4. Perform measurement conversions using dimensional analysis. 9.3.1.3 Benchmark
5. Convert between different measures of time and temperature. This is a brief section where students learn the 24-hour clock. They also use formulas to convert temperatures between Fahrenheit and Celsius. Use of the formulas is equivalent to 9.2.3.1 Benchmark, evaluating polynomial and rational expressions for a given value.
6. Interpret drug orders. This is college-level material specific to the nursing program. It is necessary in the math course so that students can calculate the amount of drug, and how often, the drug is to be given.
7. Determine the quantities of solvent, solute, and solution relevant to reconstituting solutions. This is done using dimensional analysis. 9.3.1.3 Benchmark
8. Calculate oral and parenteral dosage of drugs. This is done using dimensional analysis 9.3.1.3 Benchmark and mathematical reasoning skills.
9. Calculate intravenous dosages and flow rates. This is done using dimensional analysis. 9.3.1.3 Benchmark

10. Calculate dosages based on body weight and body surface area. To calculate body weight students must use a formula involving a square root. It is the equivalent of correctly evaluating an expression containing a radical which is contained in [9.2.3.1 Benchmark](#). Other calculations in this learning objective are done using dimensional analysis. [9.3.1.3 Benchmark](#)

11. Determine safe pediatric dosages and daily ranges of drugs. This is done using dimensional analysis [9.3.1.3 Benchmark](#) and mathematical reasoning skills.

12. Solve nursing application problems by utilizing logical and critical thinking processes. This is a college-level objective which is specific to the nursing program.

13. (ILO: 2) Employ creativity and effective problem-solving skills in a variety of mathematical contexts. This is our institutional learning objective. It is a college-level objective since it involves applying the mathematics [specifically to the nursing applications](#). Please see the following statement from our nursing coordinators.

Statement from Kari Koenig, coordinator of the registered nursing program, and Dorinda Sorvig, coordinator of the practical nursing program, written on behalf of their departments:

As stated in the course description, this course was originally developed for the registered nursing program to assist students in passing the math requirement necessary for program admission. In addition, it has been expanded as a requirement for the Practical Nursing Program. The outcomes and topics listed in the common course outline are specific to college level nursing education.