ESSEX COUNTY COLLEGE
Mathematics and Physics Division
MTH 109 – Technical Mathematics I
Course Outline

Course Number & Name: MTH 109 Technical Mathematics I

Credit Hours: 3.0 **Contact Hours:** 3.0 **Lecture:** 3.0 **Lab:** N/A **Other:** N/A

Prerequisites: Grade of "C" or better in MTH 092 or placement

Co-requisites: None **Concurrent Courses:** None

Course Outline Revision Date: Fall 2010

Course Description*:* This course covers topics selected from arithmetic, algebra, geometry, and trigonometry with applications. This course is offered to meet the needs of specific disciplines, e.g., Radiologic Technology, Ophthalmic Dispensing, and Chemical Technology.

General Education Goals: The aggregate of the core courses required for any major at ECC have the following goals:

1. **Written and Oral Communication**: Students will communicate effectively in both speech and writing.
2. **Quantitative Knowledge and Skills**: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
3. **Scientific Knowledge and Reasoning**: Students will use the scientific method of inquiry through the acquisition of scientific knowledge.
4. **Technological Competency/Information Literacy**: Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
5. **Society and Human Behavior**: Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.
6. **Humanistic Perspective**: Students will analyze works in the field of art, music, or theater; literature; and philosophy and/or religious studies; and will gain competence in the use of a foreign language.
7. **Historical Perspective**: Students will understand historical events and movements in World, Western, non-Western, or American societies and assess their subsequent significance.
8. **Global and Cultural Awareness of Diversity**: Students will understand the importance of global perspective and culturally diverse peoples.
9. **Ethics**: Students will understand ethical issues and situations.

Course Goals: Upon successful completion of this course, students should be able to do the following:

1. demonstrate knowledge of the fundamental concepts and theories from arithmetic, algebra, geometry, and trigonometry; (GEG 2)
2. utilize various problem-solving and critical-thinking techniques to set up and solve application problems taken from algebra, geometry, and trigonometry; (GEG 2)
3. communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions; (GEG 1, GEG 2) and
4. use graphing calculators effectively as a tool to solve such problems as those described above. (GEG 2)

Measurable Course Performance Objectives (MPOs): Upon successful completion of this course, students should specifically be able to do the following:

1. Demonstrate knowledge of the fundamental concepts and theories from arithmetic, algebra, geometry, and trigonometry:

   1.1 *perform basic arithmetic operations on integers, fractions, and decimals;*
   1.2 *solve right triangles and oblique triangles by using trigonometry;*
   1.3 *solve isosceles and other special triangles;*
   1.4 *state the standard form of the equation of a circle and use it to find the center and radius;*
   1.5 *use the center and radius of a circle to write the standard form equation of a circle ;*
   1.6 *graph a circle;*
   1.7 *find areas and volumes of geometric figures*;
   1.8 *set up ratios and proportions and use them to convert units into the metric system;* and
   1.9 *use the principles and properties of equality properly to solve equations of different types (linear, quadratic, exponential, logarithmic, or trigonometric) appropriate to the level of the course*

2. Utilize various problem-solving and critical-thinking techniques to set up and solve application problems taken from a variety of disciplines:

   2.1 *apply algebra, geometry, and trigonometry to solve varied real-world applications appropriate to various disciplines by creating and solving mathematical models*

3. Communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions:

   3.1 *write and explain solutions to application problems related to the course material using appropriate mathematical terminology and notation*

4. Use graphing calculators effectively as a tool to solve such problems as those described above:

   4.1 *use the GRAPH feature to display polynomial, trigonometric, exponential, and logarithmic functions*

Methods of Instruction: Instruction will consist of a combination of lectures, class discussions, group work, board work, computer lab work, and individual study.

Outcomes Assessment: Test and exam questions are blueprinted to course objectives. Data is collected and analyzed to determine the level of student performance on these assessment instruments in regards to meeting course objectives. The results of this data analysis are used to guide necessary pedagogical and/or curricular revisions.

Course Requirements: All students are required to:

1. Maintain regular attendance.
2. Complete assigned homework in a timely manner.
3. Take part in class discussions and do problems on the board when required.
4. Take all quizzes, tests and exams when scheduled. These include a minimum of three class tests as well as a final exam.

Methods of Evaluation: Final course grades will be computed as follows:

Grading Components	% of final course grade
• **Homework, quizzes, and class participation** A perusal of homework problems and quizzes and analysis of class discussion will indicate the extent to which students master course objectives.	**10 – 20%**
• **3 or more Tests** (dates specified by the instructor) Tests will show evidence of the extent to which students meet course objectives, including, but not limited to, identifying and applying concepts, analyzing and solving problems, estimating and interpreting results, and stating appropriate conclusions using correct terminology.	**30 – 50%**
• **Final Exam** The **comprehensive** final exam will examine the extent to which students have understood and synthesized all course content and achieved all course objectives.	**30 – 35%**

NOTE: The instructor will provide specific weights, which lie in the above-given ranges, for each of the grading components at the beginning of the semester.

Academic Integrity: Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

- plagiarism – the failure to acknowledge another writer's words or ideas or to give proper credit to sources of information;
- cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
- interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
- fraud – any act or instance of willful deceit or trickery.

Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

Student Code of Conduct: All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time all class meetings. No cell phones or similar electronic devices are permitted in class. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College's Code of Conduct and attendance requirements.

Course Content Outline: based on the text **Math to Build On***,* by J S Hamilton & M S Hamilton; published by Construction Trades Press, 1993.

Week	Chapter/Section	
1	1 & 2	Fractions and Decimals
2	3	Angles
3	4	Degrees, Circles, Triangles
4	5 – 7	Variables and Constants
5	Review & **Test 1**	
6 – 7	8	Right Triangles
8	9 & 10	Isosceles Triangles, Special Triangles
9	Review & **Test 2**	
10 – 11	11	Circles
12	Review & **Test 3**	
13	13 & 14	Area, Volume
14	17	The Metric System
15	**Final Exam**	