Fast Track
General Education Foundations Course Articulation
From a UH Campus to UH Manoa: INSTRUCTIONS

MATHEMATICS

The University of Hawai‘i Mathematics Faculty Working Group invites your campus to propose that one or more of your courses articulate to UHM as satisfying the UHM Foundations Symbolic Reasoning (FS) requirement. If the Working Group recommends and the University Council on Articulation (UCA) approves the proposal, students who complete any section of the course in Fall 2003-Summer 2007 with a “D” grade or better will satisfy UHM’s FS requirement if they later transfer to UHM.

This is a one-time, “fast track” process described in the memo that Deane Neubauer, Interim Vice President for Academic Affairs, distributed to all Chancellors on December 24, 2002. As explained in that memo, permanent articulation procedures are to be developed.

If your campus offers a course that is equivalent to a UHM-approved FS course and if you are interested in articulating it as a FS course, please complete a proposal and submit it to the UCA Chair by February 5, 2003. The Working Group will review your proposal and make its recommendation to the UCA on February 15. The Vice President for Academic Affairs will inform you of the decision by March 3, 2003.

Instructions to propose a course

All proposals must be submitted electronically to vpaa-gened@hawaii.edu by 4:00 p.m., Wednesday, February 5, 2003.

Electronically (MS Word or Adobe Acrobat format) submit the following to vpaa-gened@hawaii.edu:

(A) Completed proposal form (signatures not required on electronic submission) and complete answers to the questions to show how the course meets each of the Hallmarks. The form is available online at www.hawaii.edu/gened/vpaa_articulation.htm.

(B) A master syllabus. (If multiple instructors teach the course and use varying texts and/or assignments, include at least three representative syllabi.)

DEADLINE: 4:00 p.m., Wednesday, February 5, 2003.

After electronically submitting, mail a copy of completed form with appropriate original signatures, supporting materials, and master syllabus to

Dr. Karl Kim, Chair, University Council on Articulation
University of Hawai‘i at Mānoa
Fast Track
General Education Foundations Course Articulation
From a UH Campus to UH Manoa: PROPOSAL FORM, MATHEMATICS

Course Information

Course: Math 140  
Submitting Campus: Kapi‘olani Community College

Title & Catalog Description:
MATH 140 Trigonometry and Analytic geometry focuses on inverse functions, plane trigonometry, polar coordinates, conic sections, vectors.

UHM Equivalent Course (check one): [Only equivalent courses may be submitted for Fast Track review.]

X  MATH 140 Trigonometry and Analytic Geometry.

Symbolic Reasoning (FS) Hallmarks & Application Questions

Answer the following questions and submit the answers along with this form and at least one course syllabus.

1. Students will be exposed to the beauty, power, clarity and precision of formal systems. How will the course meet this hallmark? KapCC offers a two semester pre-calculus sequence (Math 135 and Math 140). The serious, earnest and conscientious treatment that this course receives insures that it will meet this hallmark. We understand that a serious treatment of mathematics reveals its beauty, along with its clarity and precision.

2. Instructors will help students understand the concept of proof as a chain of inferences. How will instructors help students understand this concept? Problems involving proofs, as well as problems involving the application of theorems are assigned and explained.

3. Instructors will teach students how to apply formal rules or algorithms. How will instructors meet this hallmark? Students are required to solve realistic situational problems by applying appropriate formulas and utilizing their algebraic and analytical knowledge.

4. Students will be required to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence. What symbolic techniques will be required and in what contexts? How will presentations and evaluations of evidence be incorporated into the course? The study of Mathematics necessarily involves symbols. KapCC’s Math 140 is a mathematics course which includes symbolic translation of problems from the real world, algebraic and analytical computations involving those symbols, and the interpretation of resulting symbols back to real world language. This transposition of symbols in context is the essence of any mathematics.

5. The course will not focus solely on computational skills. What reasoning skills will be taught in the course? Math 140 requires a combination of inductive and deductive reasoning skills.

6. Instructors will build a bridge from theory to practice and show students how to traverse this bridge. How will instructors help students make connections between theory and practice? Math 140 involves the treatment of problems requiring the application of knowledge in plane trigonometry, knowledge in functional and geometric properties of conic sections, and knowledge in complex numbers and vectors. These math applications require students to traverse the bridge between theory and practice many times.
**Required Signatures**

<table>
<thead>
<tr>
<th>Requested by</th>
<th>Charles Matsuda, Chair</th>
<th>Math/Science Department</th>
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<td>Signature</td>
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<tr>
<th>Approved by</th>
<th>Chief Academic Officer</th>
<th>Campus</th>
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Submit to vpaa-gened@hawaii.edu by 4:00 p.m., February 5, 2003.
Spring 2003
COURSE: Math 140 - 2720  Trigonometry and Analytic Geometry

3 credit hour course: Meet 9:30 - 10:50 Daily at OLAP 214

PREREQUISITE: Satisfactory completion of Math 135 or equivalent.

INSTRUCTOR:

OFFICE: Kalia - 206         Phone: 734-9415 (leave recorded message if nobody answers)

OFFICE HOURS: 07:30 - 09:00 Daily, Other Hours by appointment

TEXT BOOK: Mark Dugopolski. College Algebra and Trigonometry - 3rd edition

COURSE OBJECTIVE: Pre calculus course designed for students of Science and Engineering. Topics include Trigonometric functions, analytic geometry, polar coordinates, conic, and vectors.

HOME WORK: Homework will be collected and graded. You may collaborate with your classmates or get assistance from any source to do your homework. To receive credit for homework you must meet the following conditions:

1. Your name, the assignment number, page number, and problem numbers must be on the top the page. Make sure there must be some reasonable space between problems.
2. You must earn more than 40% in each chapter exam. If you do not meet this requirement, your home work score will be your exam score regardless of the previous score you earned.
3. Try to use Graph paper for the graphing problems.
4. No late papers will be accepted and complete homework must be turned in to pass this course. Assigned homework must be completed prior to the unit exam. In order to take unit exam, completed homework must be turned in. i.e., no homework means no exam.

A 5-10 minute quiz will be given at the beginning of each class to monitor students' progress. This also checks your attendance on time.

EXAMS: There will be 3 unit exams and a comprehensive final. To arrange an exam make-up, the student must notify the instructor prior to the return of the exam. Any exam not taken will be counted as zero. All exams taken late will be penalized.

GRADES: All the scores you acquire during the semester including the final will be added at the end of semester and the average will be computed by your total accumulated score divided by the semester total. Usually the semester total is around 1,000 points and your grades will be based on the following:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Chapter Exams:</td>
<td>3x100  =300 pts</td>
<td>90% - 100% A</td>
</tr>
<tr>
<td>Homework:</td>
<td>=210 pts</td>
<td>80% - 89 B</td>
</tr>
<tr>
<td>Quiz: 47x5</td>
<td>=235</td>
<td>70% - 79% C</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>300 pts</td>
<td>Below 60% F</td>
</tr>
<tr>
<td>Total</td>
<td>around 1000 pts</td>
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Note: Any student who "disappears" without officially withdrawing (you complete the procedure paying $5.00?) will receive an F.
The final examination will include a portion which tests your achievement of a mandatory minimum standard for this course. FAILURE TO ATTAIN A SATISFACTORY SCORE ON THIS PORTION OF THE FINAL EXAMINATION WILL AUTOMATICALLY RESULT IN A FAILING GRADE FOR THE COURSE, which supersedes any other grading procedures stated in this syllabus. On the other hand, if your score meets or exceeds this cutoff score, you will not automatically pass, but could receive any grade from A to F, according to the grading procedures outlined elsewhere in this syllabus.

The Math/Science Department policy on Withdrawals from courses and Incomplete grades is as follows:

1. Withdrawals (W grade) - After the "last day for all withdrawals," which is found on the calender in the schedule of courses, the instructor will sign withdrawals only in cases of extreme or unusual circumstances. Grade related excuses are unacceptable. Examples of extreme or unusual circumstances are:
   a) a certified medical reason.
   b) a death in the immediate family.

2. Incomplete (I grade) - students must present the "request for Incomplete" form prior to the last day of instruction. "I" grades will be given only to students who are achieving passing grades and are very close to completing the course. In addition, the student must have a very good reason for not being able to complete all the work on time. Examples of good reasons are the same as those listed under the withdrawal policy above.

The Mathematics Department policy on Prerequisite Checking is as follows:

Students who enroll in a mathematics class must have satisfied the prerequisite for that class. The prerequisite is a grade of "C" or better in the prerequisite course or a sufficient placement test score from within the last two years. Transfer students who have satisfied this prerequisite elsewhere will be required to provide one of the following forms of documentation for approval:
   a) a report card or transcript from another UH campus.
   b) a placement test result from another UH campus.
   c) a college transcript, accompanied by a catalog course description, from outside the UH system.

Carry these documents with you during the first two weeks of classes. Documents from within the UH system must be shown to the Mathematics Coordinator for approval. Students who have not satisfied the prerequisite or who fail to provide the necessary documents will not be allowed to remain enrolled in the class.

INSTRUCTOR ABSENCE:
If on a regular class day the instructor does not arrive within fifteen (15) minutes of the scheduled starting time, students are dismissed. Normally, if the instructor is absent, a message will be sent to the class. However, make-up classes are hard to arrange and you should keep up with the assignment schedule.
1. Kapiolani Community College is an Equal Opportunity/Affirmative Action Institution.

2. If you have a disability and have not voluntarily disclosed the nature of your disability and the support you need, you are invited to contact the Special Student Service Office, 734-9552 (V/TTY), Ilima 105, for assistance.
Math 140 Assignments: Spring 2003

Ex 5.2 (p. 413) 1, 2, 10, 12, 23, 27, 36, 37, 54, 59, 66, 68, 70, 89-94, 98.
Ex 5.3 (p. 428) 1, 4, 9, 10, 28, 29, 37-40, 43, 47, 64-74, 83.
Ex 5.4 (p. 478) 2, 6, 9, 12, 17, 36, 38, 40, 42, 44, 58, 60, 74, 76, 77-80, 86, 88.
Ex 5.5 (p. 488) 4, 8, 10, 11, 18-23, 31, 35-40, 60-64, 68, 76, 78-84, 87-90, 97, 98.
Ex 5.6 (p. 500) 6, 8, 12, 16, 22, 30, 40, 43, 47, 51, 55.
Chap 5 Test (p. 510) 1-28.

Unit Exam (Chapter 5) Feb 5, Wednesday

Ex 6.1 (p. 520) 2, 4, 10, 11, 14, 19, 20, 28, 36, 41, 43, 49, 50, 58, 60, 64, 66.
Ex 6.2 (p. 528) 1-10, 16, 32, 36, 40, 54, 56, 58, 64, 73.
Ex 6.3 (p. 538) 5-8, 10, 14, 16, 22, 24, 26, 31, 35-42, 44, 46, 52, 53, 56, 63, 71, 74, 78.
Ex 6.4 (p. 546) 6, 7, 8, 10, 12, 14, 17, 19, 21, 23, 26, 27, 30, 37, 38, 45, 48, 50, 54, 55.
Ex 6.5 (p. 557) 3, 5, 10, 18, 20, 27, 29, 32, 34, 36, 38, 41, 42, 46, 47, 48, 55.
Ex 6.6 (p. 571) 2, 6, 10, 20, 21, 24, 26, 34, 43, 45, 46, 49, 50, 52, 54, 56, 62, 63, 64, 74, 84, 90.
Chap 6 Test (p. 576) 1-20.

Unit Exam (Chapter 6) March 7, Friday

Ex 7.1 (p. 588) 4, 8, 10, 16, 20, 26, 28, 29, 31, 32, 35, 37, 39.
Ex 7.2 (p. 597) 2, 10, 16, 23, 24, 26, 28, 30, 34, 37.
Ex 7.3 (p. 612) 4, 16, 21, 25-28, 33, 36, 40, 42, 44, 46, 56, 60, 62, 64, 68, 77, 80, 81, 83, 84.
Ex 7.4 (p. 621) 10, 15, 18, 21, 26, 27, 35-39, 44, 50, 54, 58, 63, 64.
Ex 7.5 (p. 627) 4-6, 12, 14, 16, 20, 24-27, 30, 31, 34, 35, 38, 44, 46, 48, 52, 54.
Ex. 7.6 (p. 637) 2, 7, 8, 10, 22, 24, 32, 34, 36, 39, 44, 45, 49, 58, 60, 64, 68, 74, 78, 80.
Ex 7.7 (P. 642) 2, 4, 6, 8, 11, 13, 14, 17, 19, 21, 23, 24.
Chap 7 Test (p. 647) 1-26

Unit Exam (Chapter 7) April 2, Wednesday

Ex 10.1 (p. 787) 3, 6, 7, 14, 16, 18, 20, 24, 26, 38, 44, 50, 52, 57-60.
Ex 10.2 (p. 800) 2, 4, 10, 20, 22, 23, 27, 28, 31, 32, 37, 40, 54, 56, 58, 60, 62, 64, 66, 72, 76.
Ex 10.3 (p. 813) 4, 10, 16, 18, 21, 23, 25, 29, 30, 36, 39, 40, 43.
Chap 10 Test (p. 819) 1-19.

Unit Exam (Chapter 10) May 7, Wednesday

Final Exam (comprehensive) May 14, Wednesday, 7:45 - 9:45
MATH 140 Trigonometry and Analytic Geometry.

1. COURSE INFORMATION: Date: 10/11/02

MATH 140 Trigonometry and Analytic Geometry

(3) AA/ML

3 hours lecture per week

This course covers inverse functions, plane trigonometry, polar coordinates, conic sections and vectors.

Prerequisite(s): A grade of “C” or higher in MATH 135 or qualification for MATH 140 on math placement test.

2. COURSE OBJECTIVES/COMPETENCIES:

Upon successful completion of MATH 140, the student should be able to:

• Solve verbal and non-verbal problems in plane trigonometry.
• Relate functional and geometric properties of conic sections.
• Simplify algebraic expressions involving complex numbers.
• Relate vectors with circular functions.

3. GENERAL EDUCATION AND RELATIONSHIP TO OTHER COURSES:

MATH 140 is an elective course in the Liberal Arts curriculum. MATH 140 provides students with the proper skills in mathematics to support the intense science course requirements in Physics, Chemistry and Health Sciences. Courses in Pre-calculus prepare the students for the Calculus sequence. MATH 140 provides an environment where students apply problem solving methods, logical reasoning, and critical thinking abilities. It satisfies the requirements of any degree program requiring a 100 level Mathematics course. The prerequisite course, MATH 135, introduces the preliminaries of Pre-calculus. A student would not be able to succeed in MATH 140 without Math 135 or the equivalent preparation.

This course supports the following college competency areas:

• Computation and communication abilities.
• Quality of life as affected by technology and science.
• Problem-solving and decision-making abilities.

This course also satisfies the following Associate in Arts degree competencies:

AA -
Critical Thinking:
Upon completion of an A.A. degree, the student should be able to:
• Identify and state problems, issues, arguments, and questions contained in a body of information.
• Identify and analyze assumptions and underlying points of view relating to an issue or problem.
• Formulate research questions that require descriptive and explanatory analyses.
• Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.
• Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.
• Apply problem-solving techniques and skills, including the rules of logic and logical sequence.
• Synthesize information from various sources, drawing appropriate conclusions.
• Communicate clearly and concisely the methods and results of logical reasoning.
• Reflect upon and evaluate their thought processes, value systems, and worldviews in comparison to those of others.

AA -
Quantitative Reasoning:
Upon completion of an A.A. degree, the student should be able to:
• Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.
• Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.
• Communicate clearly and concisely the methods and results of quantitative problem solving.
• Formulate and test hypotheses using numerical experimentation.
• Define quantitative issues and problems, gather relevant information, analyze that information, and present results.
Written Communication:
Upon completion of an A.A. degree, the student should be able to:

- Gather information and document sources appropriately
- Express a main idea as a thesis, hypothesis, or other appropriate statement.
- Develop a main idea clearly and concisely with appropriate content.

This course also satisfies the following Associate in Science degree competencies:

- Employ skills and understanding in language and mathematics essential to fulfill program requirements. Understand attitudes and values of various cultures and examine their potential for improving the quality of life and meaningfulness in work.
- Recognize effects of technology and science on the natural and human environments.
- Demonstrate proficiency in conceptual, analytical, and critical modes of thinking.
- Demonstrate competence in a selected program of study.

MATH 140 satisfies the following departmental and/or program competencies:

Upon completion of an A.A. degree, the student should be able to:

- Reason mathematically and understand mathematical concepts.
- Apply mathematical reasoning and concepts in a study of the relationship of mathematics to the modern world.

4. COURSE CONTENT:

A. The trigonometric functions. (12 hours)

Angles and their measurements.
Trigonometric functions, properties and graphs.
The inverse trigonometric functions.
Right triangle trigonometry.

B. Trigonometric Identities and Equations. (12 hours)
Verifying identities.
Sum and difference identities.
Double-angle and half-angle identities.
Product and sums identities.
Trigonometric equations.

C. Applications of Trigonometry. (12 hours)

The laws of sines and the law of cosines.
Vectors.
Complex numbers.
Polar Equations.

D. The conic sections. (9 hours)

The parabola
The ellipse and the circle.
The hyperbola.

5. POSSIBLE TEXTS:


Supplies and equipment: A scientific calculator.

6. METHODS OF INSTRUCTION:

The normal method for this class is Lecture. Supervised collaborative group work in class is appropriate for some areas. The instructor should require student participation in class discussions. The learning process is enhanced when the instructors encourage the students to use the MATH LAB. There are online and local math software programs for Pre-calculus.

7. METHOD OF EVALUATION:

A student's grade in the course is determined by computing an average of the semester's course work, including daily homework(approx. 10%), quizzes(10%), unit exams(60%), and a cumulative final exam(20%).

In the Math/Science Department grades are usually assigned according to the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89.9%</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79.9%</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69.9%</td>
</tr>
<tr>
<td>F</td>
<td>less than 60%</td>
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</table>
Some flexibility is given to instructors in these matters. It is to be understood that every instructor will clearly inform students on his/her syllabus which percentages are to be used to weight the course work and the grading scale used.

It is not appropriate to evaluate student competency in a mathematics course by using only a mid-term and final exam. Dropping exam scores from entire units of competencies when computing the final grade would also be inappropriate.

8. JUSTIFICATION:

   A. This is an update of MATH 140 corresponding to the 5-year cycle review.
   B. This is not experimental course.
   C. This course will not increase or decrease the number of required hours needed for a certificate or degree.

9. RESOURCE REQUIREMENTS:

   A. This proposal will require no additional resources, as it is simply an update of an existing course.
   B. The addition of this course should not have any impact on department or programs, as is simply an update of an existing course.
   C. Maximum section enrollment is 35. It is expected that we can continue to meet demand by offering four sections per semester for the foreseeable future.

10. ARTICULATION:

   A. Similar courses at other UH colleges:

   Honolulu CC: MATH 140, Trigonometry and Analytic Geometry, 3 hours.
   Leeward CC: MATH 140, Trigonometry and Analytic Geometry, 3 hours.
   Maui CC: MATH 140, Trigonometry and Analytic Geometry, 3 hours.
Windward CC: MATH 140, Trigonometry and Analytic Geometry, 4 hours

All courses listed cover the same topics. The only difference is that WCC lists MATH 140 as Trigonometry and Analytic Geometry with 4 hours credit but no difference in contents.

B. Is this course appropriate for articulation with the UH Manoa General Education Core Requirements?

This course has already been articulated with the UH Manoa's General Education Core Requirements. Because this proposal does not involve any change in course content or competencies, it is not appropriate to rearticulate this course.

C. Is this course appropriate for articulation with any other department or college requirements in the UH system?

This course has been articulated with all the above mentioned campuses in terms of fulfilling the same department and college requirements as does MATH 140 at each of the respective campuses.