

# Leeward Community College

## Essential Mathematics for Algebra

**1. Course Alpha**

MATH

**2. Course Number**

18

**3. Number of Credits**

3.0

**4. Effective Term**

Fall 2010

**5. Course Title**

Essential Mathematics for Algebra

**6. Catalog Title**

Essential Mathematics for Algebra

**7. Prerequisites**

Any one of the following, or an articulated equivalent, within the past two years will qualify a student for MATH 18: C or better in MATH 1B OR qualifying placement test score (21 or higher in the COMPASS pre-algebra placement domain)

**8. Corequisites**

None

**9. Recommended preparation**

None

**10. Catalog Description**

MATH 18 covers essential mathematical concepts and procedures needed for success in Elementary Algebra: properties of and operations with whole numbers, fractions, mixed numbers, decimals, integers, signed numbers, and exponents, ratios, proportion, and percent with applications variable expressions and simplification elementary linear equations with applications and basic plane geometry.

**11. What are the general student learning outcomes? (What knowledge and/or skills will successful completion develop in the students?)**

Upon successful completion of MATH 18, a student should be able to

- Identify and practice sound math study skills.
- Correctly perform arithmetic operations on whole numbers, fractions, decimals, and signed numbers.
- Choose and apply appropriate formulas for geometric plane figures.
- Solve and check basic linear equations.
- Simplify basic algebraic expressions.
- Mathematically model and solve applied problems using rates, proportions, percent, and linear equations.
- Select and correctly utilize precise mathematical language and symbols to effectively communicate procedures and results.

Course SLO
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Mathematically model and solve applied problems using rates, proportions, percent, and linear equations.
Select and correctly utilize precise mathematical language and symbols to effectively communicate procedures and results.

## 12. Course Content

**What evidence exists that the course content is appropriate, relevant, and covered in sufficient depth? (addresses breadth, depth, relevancy) What evidence exists that the course reflects current theory and practice in the content area? (addresses currency)**

The topics covered in this course are:

- Operations with, and properties of, whole numbers
- Operations with, and properties of, fractions and mixed numbers
- Operations with, and properties of, decimals
- Operations with, and properties of, integers
- Operations with, and properties of, signed numbers
- Ratios, proportions, percent, and related applications
- Measurements and calculations relating to geometric figures
- Simplification of simple variable expressions
- Solving simple linear equations in one variable

Evidence that these topics are appropriate, relevant, and covered in sufficient depth include:

- These topics are a subset of the topics currently covered in Leeward CC's MATH 1B and 22 courses. These were specifically identified by consensus of Leeward CC developmental mathematics faculty as those specifically needed for success in our Math 73 (Algebraic Foundations I) course.
- These are the topics covered by standard pre-algebra and basic college mathematics textbooks that prepare students for elementary algebra courses.
- These topics, and their depth of coverage, are aligned with the topics and depth of coverage at the other UHCC campuses' pre-algebra courses.

Evidence that the course reflects current theory and practice in the content area include:

- A wide selection of current textbooks and technology was reviewed and considered before the course content and anticipated procedures were decided on by a committee of Leeward CC math faculty, who have been teaching a variety of courses over many years.
- The anticipated course procedures follow contemporary principles of course redesign as promulgated by national organizations.
- Student learning will be supported by current mathematical educational software that has been vetted by many colleges nation-wide and whose contemporary successes have been widely documented.

**13. How is this course related to the educational needs and goals of the division, college, and community as reflected in the Strategic Plan? How is it related to courses and programs in other disciplines?**

MATH 18 can reduce the time needed to reach an algebra course from two semesters to one. In addition, along with the companion MATH 82 proposed course, when both courses are offered in redesigned format, sufficiently motivated students will have the opportunity to finish the entire developmental sequence of math courses in a single semester. In these ways, MATH 18 addresses strategic outcome II.2.B of the 2008-2015 Strategic Plan Update: Modify the traditional structure and delivery of programs to accommodate the full-time employed adult student and that shortens student time to degree.

MATH 18 will provide students an alternative to MATH 1B and MATH 22 in the sequence of remedial/developmental courses in the mathematics discipline.

A number of courses list MATH 1B as a prerequisite or recommended preparation. These should not be affected since MATH 18 uses a prerequisite of a C or better in MATH 1B and uses the same minimum placement test score that MATH 22 previously used.

ASTR 110 lists a C or better in MATH 22 as a prerequisite. MATH 18 might be considered an alternative since it includes the majority of the topics covered in MATH 22.

LSK 110, OCN 201, OCN 201L, and SCI 103 list MATH 22 as a recommended preparation. MATH 18 might be considered as an alternative since it includes the majority of the topics covered in MATH 22.

No Leeward CC program lists MATH 1B or MATH 22 as a required course.

**14. For what program was the course designed? Is it an approved program? Will the course be required or elective? Will the course lengthen the time for the students to complete the program? Will it replace another course?**

While not designed for any specific program, MATH 18 provides an alternative to MATH 1B and MATH 22 in the sequence of remedial/developmental mathematics courses.

MATH 18 will not lengthen the time needed for any student to complete a degree. Since the placement test minimum cut score for MATH 22 will be raised as a result of course assessment, students who otherwise would have been required to take both MATH 1B and MATH 22 can instead meet the prerequisite to MATH 73 in a single semester by taking MATH 18. In this way, MATH 18 could shorten the time needed to complete a program.

MATH 18 provides an alternative to MATH 1B and MATH 22 in the sequence of remedial/developmental mathematics courses but does not replace either course.

**15. How many hours will the students spend per week in lectures, laboratories, seminars, or other supervised instruction?**

MATH 18 could be offered either as a lecture or as a redesigned lab-style course.

As a lecture course, students will spend 3 hours per week in class for 16 weeks, which is the usual for a 3 credit course.

As a lab-style course, students will spend a combined total of 7-9 hours per week for 16 weeks in a supervised and unsupervised computer-aided instruction.

**16. What independent work will be required of students? (Reading, research, writing, special projects, etc.) For written or other special projects, identify the usual number and length of projects. For readings, where the entire book or pamphlet is not used, indicate the portion of the material to be used.**

MATH 18 could be offered either as a lecture or as a redesigned lab-style course.

As a lecture course, students will be expected to prepare textbook or computerized homework and prepare and submit other projects, which could include quizzes and written reports.

As a lab-style course, students will spend a combined total of 7-9 hours per week for 16 weeks in a supervised and unsupervised computer-aided instruction.

**17. What experiential or professional preparation is required to teach this course? Do we have a full-time faculty member who meets these requirements? If not, who will teach the course?**

All full-time mathematics discipline faculty members are able to teach this course.

By UHCC system-wide agreement of academic Deans, the current minimum qualification required is any one of the following:

- Master's degree in mathematics
- Master's degree in education with a bachelor's degree in mathematics
- Master's degree in math education

**18. Is a similar course taught at any other community college? Any other UH college? If so, provide information about the course identification and content of similar courses. If this course differs in important ways from existing similar courses, explain how.**

MATH 18 is similar, but not identical, to the following courses taught at other UHCC campuses:

- MATH 20B/C/D: Foundation Math at Honolulu CC
- PCM 23: Pre-College Mathematics at Kapiolani CC

19. If this course is comparable to a course taught on a four-year campus, and is intended to count in lieu of that course, the proposal must contain evidence of up-to-date information as to the content and objectives of the course on the four-year campus. (This information may be obtained through discussion with faculty teaching the course on the four-year campus or by obtaining a copy of the course syllabus or outline.)

NO

Not applicable

20. If the course is appropriate for articulation with the UH Manoa general education core or with any other department or college requirements on a UH four-year campus, provide a brief rationale.

Not applicable

## 21. Methods of instruction

- Class Discussion
- Computer Activities
- Demonstrations
- Group discussions
- Internet enhancement
- Lab
- Lectures
- Problem-based learning
- Tutors

Instructors normally use a combination of the methods mentioned above in an attempt to maximize effectiveness of instruction. Faculty members teaching the course engage in constant dialogue among themselves as well as with their colleagues from the other campuses to discuss teaching techniques and strategies. They also attempt to maintain currency through their participation in conferences sponsored by professional organizations like the Pacific Island Mathematical Association of Two-Year Colleges and the Hawaii Council of Mathematics for Teachers.

## 22. Methods of Evaluation

- Attendance
- Exam
- Others
- Take home assignments

Method of Evaluation
Attendance
Exam
Others
Take home assignments

- Others include computer-generated and corrected homework and assessments. Instructors

normally use a combination of the methods mentioned above in an attempt to accurately assess a student's mastery of the course material.

### 23. Is Textbook Required

When offered as a lecture course, a textbook will be required. A sampling of current textbooks that cover the appropriate material include:

- Basic College Mathematics, by Miller, O'Neill, and Hyde
- Basic Mathematics, by McKeague
- Fundamental Mathematics, by Bittinger

When offered as a redesigned lab-style course, an access code for the appropriate educational software program will be required but a corresponding textbook will be optional. A sampling of current Software programs that are appropriate include:

- ALEKS, supported by the textbook Basic College Mathematics, by Miller, O'Neill, and Hyde
- Enhanced Web Assign, supported by the textbook Basic Mathematics, by McKeague
- MyMathLab, supported by the textbook Fundamental Mathematics, by Bittinger

### 24. Exclude from Catalog

NO

### 25. Justify the level of proposed course:

**What evidence exists that the course appropriately covers areas with sufficient emphasis for a remedial, a developmental, or a college-level course? (addresses rigor)**

MATH 18 covers a subset of the combined material in Leeward CC's MATH 1B and MATH 22 courses, and similar levels of depth. The topics and depth of coverage are consistent with courses prerequisite to elementary algebra courses both system-wide and nation-wide.

### 26. Will this course require additional staff, equipment, facilities, or other cost items? If so, are they available? Are they included in the budget, or will they be covered by reallocation?

No, since sections of MATH 18 will replace some sections that would previously have been assigned as MATH 22 on a one-for-one basis.

### 27. Expectations for Student Participation. Students are expected to spend at least two hours outside of class for every hour in class by means of the following activities:

- Computer Projects
- Homework Assignments
- Practice Lab Time

### 28. What change is proposed in the course? (Provide specific information on both the new and the old course.)

Not applicable

**29. What is the rationale for the change?**

Not applicable

**30. Is the change substantive enough to require a change in course identification? If so, explain in detail.**

Not applicable

**31. Is the course currently articulated with any four-year program? If so, give details and dates of agreement(s) and explain any impact the proposed change may have upon articulation.**

No, MATH 18 is not and will not be articulated with any four-year program.

**32. Will the change require additional staff, equipment, facilities or other resources? If so, provide details and indicate whether they are available.**

No, since sections of MATH 18 will replace some sections that would previously have been assigned as MATH 22 on a one-for-one basis.

**33. Will this change increase or decrease the number of required hours for attainment of a certificate or a degree? If so, provide details and justification.**

MATH 18 will not lengthen the time needed for any student to complete a certificate or degree. Since the placement test minimum cut score for MATH 22 will be raised as a result of course assessment, students who otherwise would have been required to take both MATH 1B and MATH 22 can instead meet the prerequisite to MATH 73 in a single semester by taking MATH 18. In this way, MATH 18 could shorten the time needed to complete a program.

**34. Distance Education**

a) what methods will be employed to ensure timely and effective interaction between faculty and students and student to student?

b) What technological skills will students need to succeed in this course?

c) How will the instructor execute and ensure the rigor and breadth of the course through electronic delivery?

Though not strictly a distance course, there are many aspects of the redesigned model that are similar to a distance course.

Students will be required to attend an on-campus orientation that will allow students to meet the instructor, acclimate themselves to the required software and learn about course and technology procedures. Phone, email, Lulima, and messaging systems built into the required software programs will be extensively utilized to ensure timely and effective communication between faculty and students and, where appropriate, between students.

No specialized skills beyond email and internet access and familiarity are needed in order to succeed in the course. The required software program has tutorials that guide students through entering answers, graphing, and other specialized technological operations.

Rigor and breadth are executed and ensured by the careful selection of software package, careful selection of the topics covered, and requiring proctored testing.

**35. Distance Education**

What type of academic support and technology training will be required to ensure pedagogical

What type of academic support and technology training will be required to ensure pedagogical development of the instructor for this course?

Faculty training and practice in the selected program was ongoing throughout the development for the original developers of the course. Training sessions were and are scheduled for support staff, tutors and new faculty who are expected to teach the course.

### 36. Distance Education

How will specific technology be integrated into the course, and how will its use be appropriate to the nature and objectives of the course?

The sections of the course that follow the redesign model rely primarily on a publisher-developed and supported software platform for learning, assessment, and reporting. The appropriateness and success of the programs that were considered have been documented at the national level.

### 37. Course Curricular Function: (Please explain the function of this course as it relates to the College Mission and the achievement of relevant degree and certificate program requirements.)

MATH 18 relates to the "Learning and Teaching" statements in the Leeward CC Mission (2009-2010): To specialize in the effective teaching of remedial/developmental education, general education, and other introductory liberal arts, pre-professional, and selected baccalaureate courses and programs, with the goal of seamless system articulation and transfer, where appropriate. To structure our programs in such a way that they reflect not only academic rigor but also student development, learning outcomes and student goals. The College is committed to the achievement of student learning.

Though not designed for a specific degree or certificate, MATH 18 serves as an alternative to MATH 1B and MATH 22 in the sequence of remedial/developmental mathematics courses.

### 38. What evidence exists that the course is taught so that skills are built on what has been learned earlier in the course (or in a previous course) and will lead to what will be learned in a future course?

The mathematics discipline has carefully planned the content of this course to meet the needs of the subsequent courses in the sequence (MATH 73 and the proposed MATH 82) while keeping the specific prerequisite skills learned in MATH 1B in mind. This choice and alignment was the result of a discipline-wide review of all of the developmental mathematics course syllabi as well as careful consideration of the content and expectations of courses system-wide that serve the same curricular function as a pre-requisite to elementary algebra.

### 39. Comments

The discipline vote was 25 for; 0 against; 0 abstained.

### 40. Justify the need/demand for the proposed course. (Attach documentation, e.g., surveys, reports, advisory committee recommendations, etc.)

MATH 22 course assessment results from spring 2009 indicated that students were not mastering the SLOs at an appropriate level. Only 27% demonstrated mastery of one SLO and only 40% demonstrated mastery of another. Successful completion rate data for MATH 22 showed a dramatic difference between students whose compass placement scores were in the 21-30 range (31%) compared to the higher 31-46 range (46%). These data, coupled with the observation that the other CC campuses used minimum COMPASS cut scores of 30 or greater for their MATH 22 courses, led the discipline to the conclusion that an increase in the minimum COMPASS cut score was needed for

MATH 22. However, such an increase would increase the time to a degree or certificate for students



MATH 22. However, such an increase would increase the time to a degree or certificate for students who would then be placed into the lower MATH 1B course. COMPASS placement data shows that 183 students in the fall 2008 semester would have been affected by such a change in cut score with the existing courses. MATH 18 solves this issue by providing such students with a one semester path to MATH 73.

- 41. If the course is renumbered to be 100 or above, how does it meet the criteria for Transfer Courses, Attachment III? An analysis as to how those criteria are met should be provided.**

Not applicable

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