

**Minutes of the
Academic Advisory Committee on Mathematical Subjects
February 26-27, 2004**

The Academic Advisory Committee on Mathematical Subjects (ACMS) met on February 26-27 on the campus of South Georgia College in Douglas, Georgia. The meeting began at 1:00 p.m. on Feb. 26 with a discussion led by Jim Brawner about a proposed new course on Quantitative Skills and Reasoning. Most members expressed satisfaction with the topics listed in the proposed new course, but some suggested that it might be preferable to change the existing description of MATH 1101 rather than introduce a new course in Core Area A. Action on this item was taken at the business meeting on February 27.

Cathie Aust and Jack Morrell then led a discussion of proposed common student learning outcomes for MATH 1101, 1111, and 1113. Cathie Aust presented the learning outcomes for MATH 1101 and MATH 1111 that were presented at the 2003 ACMS meeting. Wayne Bosché proposed that the course descriptions be added to the list of learning outcomes for both MATH 1101 and MATH 1111. Jack Morrell led a discussion of common student learning outcomes for MATH 1113. A number of modifications were suggested. Action on these items was taken at the business meeting on February 27.

Jim Helms then led a discussion of the report of the Ad Hoc Committee on DOE New Curriculum Standards (“Georgia Performance Standards”) in Mathematics. He discussed the principal issues in the committee’s report. Very specific standards in the old QCC have been replaced by vague descriptions of topics, with frequent mismatching of standards and tasks. Misused and ambiguous mathematical statements are numerous. Functions are not mentioned in any standard in the high school curriculum. Some tasks and standards are misplaced. Concern was expressed about the implementation schedule. Most importantly, the training for teachers in two days of workshops seems extremely inadequate. The 8th grade curriculum is particularly problematic. It contains an enormous amount of new material, far above the expectations in 6th and 7th grade. The standards seem to be taken from Japanese standards without recognizing the differences in cultures. Suggestions were made to prominently list a succinct statement of concerns on the first page, with elaboration following. BOR representative Dorothy Zinsmeister suggested that this committee should propose a possible alternative curriculum, perhaps modeled on North Carolina’s standards. BOR liaison Kathleen Burk suggested that, in addition to our committee’s recommendation, each of us individually respond with comments on the GPS website and encourage faculty from our institutions to do the same. Action on this issue was taken at the business meeting on Feb. 27.

Business meeting:

Chair Cathie Aust of Clayton College and State University convened the business meeting at 8:30 a.m. on Friday, February 26. She introduced Dr. Edward D. Jackson, President of South Georgia College, who welcomed the committee to South Georgia College.

Representatives and Visitors Attending

Georgia State University	Johan Hattingh
University of Georgia	Dan Kannan
Georgia Southern University	Xiezhang Li
Valdosta State University	Ashok Kumar
Albany State University	Zephyrinus C. Okonkwo
Armstrong Atlantic State University	Jim Brawner
Augusta State University	Sam Robinson
Clayton College and State University	Cathie Aust
Clayton College and State University	Anthony J. Giovannitti
Columbus State University	Tim Howard
Fort Valley State University	Alvina J. Atkinson
Georgia College and State University	Lila Roberts
Georgia Southwestern State University	John Stroyls
North Georgia College and State University	John Cruthirds
Southern Polytechnic State University	Joel Fowler
Dalton State College	Wayne Bosché
Macon State College	Steven M. Davis
Macon State College	Barry J. Monk
Atlanta Metropolitan College	Jack Morrell
Coastal Georgia Community College	Bob Balman
Floyd College	Brent Griffin
Gainesville College	Danny Lau
Georgia Perimeter College	Robby Williams
Gordon College	Allen Fuller
Middle Georgia College	Roberta N. Yauck
South Georgia College	Charles Douglas
Waycross College	Jim Helms
Georgia Board of Regents	Kathleen Burk
Georgia Board of Regents	Dorothy Zinsmeister

Chair Aust then recognized Kathleen Burk, liaison from the Board of Regents.

Dr. Burk reported a request from the Board of Regents to develop over the next year a common course description and number for multiple versions of Calculus I. She expressed that the BOR had interest in developing an end-of-course test for students completing Algebra II. This could be used in place of COMPASS tests that are currently used for placement in college mathematics courses. Concern was expressed that identifying which courses in the proposed new curriculum correspond to Algebra II is problematic. She confirmed that the system is not requiring the Regents' Test for Quantitative Skills, although an optional paper version of the test is being developed.

Chair Aust then recognized Dorothy Zinsmeister from the Board of Regents.

Dr. Zinsmeister reported that she will be compiling this committee's Area F requirements with those from other disciplines. She was pleased to hear our discussion of common student learning outcomes. She remarked that, particularly at a time when some institutions have part-time faculty teaching over 60% of introductory courses that they offer, the importance of developing these common learning outcomes is critical. She requested that we list the topics in common core courses along with the student learning outcomes. She presented a proposal to the committee concerning the quantitative reasoning course. The Georgia BOR has been invited by the MAA and the NSF to work with other states to apply for a grant proposal to provide funding for mathematicians to develop a quantitative reasoning course and an end-of-course exam, and pilot that course and exam at system institutions. She described the work done by a USG consortium over the past year putting together a mathematics endorsement program for P-5 teachers targeted at certified teachers that have not had the mathematics that is currently required for pre-service teachers. She encouraged ACMS members to work with their institutions' colleges of education to offer this endorsement program. Members requested that information about the courses be posted on a website and be sent to mathematics department heads and appropriate deans. She commended the committee's work on the proposed new curriculum and mentioned the newspaper article in the February 27, 2004 Atlanta Journal-Constitution that gave a favorable review of the proposed new Georgia Performance Standards in mathematics. She concluded by mentioning that BOR liaison Kathleen Burk is retiring shortly. Past-Chair Wayne Bosché commended Dr. Burk's service and remarked that she has been a very effective conduit between the ACMS and the Board of Regents.

Minutes accepted: A motion to accept the minutes of the February 2003 meeting of the ACMS as previously distributed was made, seconded, and approved by voice vote.

Chair Aust then reported the following recommendation from the executive committee, which was approved by voice vote.

Successful motion: The slate of nominees for the incoming Executive Committee should consist of 4 or 5 ACMS members to include the current Chair (if that person is scheduled to remain a member of ACMS), the current Chair-Elect, a nominee for incoming Chair-Elect, and one or two at-large members. At-large nominees should be selected so that the committee includes at least one person from a research university or a regional university, at least one from an institution that offers a Bachelor's degree in mathematics (other than a research or regional university), and at least one from an institution that has no Bachelor's degree in mathematics.

Chair Aust gave the Executive Committee's list of nominees for new members of the Executive Committee, noting that she will not be serving on the ACMS next year, so that there will be no past-chair for the 2004-05 year. The list was approved by voice vote to create the following 2004-2005 Executive Committee:

Jim Brawner	Chair	Armstrong Atlantic State University
Lila Roberts	Chair-elect	Georgia College & State University
Dan Kannan	Representative	University of Georgia
Wayne Bosché	Representative	Dalton State College

A second recommendation that Dan Kannan and Lila Roberts join the executive committee immediately as at-large members for the completion of the 2003-2004 academic year was made, seconded, and approved by voice vote.

After some discussion regarding the location of the 2004-2005 ACMS meeting, the following motion was made, seconded, and approved by voice vote:

Successful motion: The ACMS will hold its 2004-05 annual meeting at Clayton College and State University on a Thursday afternoon and Friday morning to be determined, perhaps coinciding with the Georgia Perimeter College Mathematics Conference.

Subcommittee Reports

Assessment of the Major: John Stroyls (Chair), Jean Bevis, Joel Fowler, Joy Shurley. Joel Fowler distributed copies of the report of the subcommittee. A question was raised about the absolute number (10) of graduates per year that triggers a comprehensive program review. Dorothy Zinsmeister explained the history of that recommendation; the RACIE committee recommended that the cutoff level be an absolute number rather than a prorated number based upon enrollment, with productivity and viability of the program as substantive issues. Committee members reiterated the burden of continual comprehensive program review. A list of websites was distributed to help USG institutions monitor national trends in program assessment.

Computer Science Liaison: Ashok Kumar (Chair), Ijaz Awan, William Snyder, Edward Bolton. No report.

Distance Learning: Wayne Bosché (Chair), Jim Dias, Sam Robinson, Robert Wynegar. Wayne Bosché reported that the online versions of the Bachelor of Science in Information Technology program is ready to go and should be approved shortly by the Board of Regents. The Bachelor of Applied Science program is in development. The second two years of the programs are completed online after the core is completed.

Faculty Development: Tim Howard (Chair), Dan Kannan, Zephyrinus Okonkwo, Bruce Landman. No report.

Mathematical Awareness: Allen Fuller (Chair), Yang Wang, Xiezhong Li, John Cruthirds. No report

Placement/Learning Support: Lila Roberts (Chair), Robert Balman, Alvina Atkinson, Danny Lau. Lila Roberts reported that she would like to survey departments on placement for learning support and beyond.

Textbook: Brent Griffin, Steven Davis, Robby Williams, James Helms. Brent Griffin reported that 10-12 responses have been received so far on the textbook survey, and he requested that committee members report their textbooks in the next three weeks on the ACMS WebCT site.

Curriculum and Transfer Credit: Jack Morrell (Chair), Jim Brawner, Marla Bell, Roberta Yauck, Charles Douglas. Jack Morrell reported that many issues were covered in the discussion of common student learning outcomes. He directed members to supply to him information about calculus topics at their institution.

Old Business

Jim Brawner made the following motion concerning a proposed new course, MATH 1001, Quantitative Skills and Reasoning (course description appended); the motion was seconded and approved by voice vote.

Successful motion: The ACMS recommends that MATH 1001, Quantitative Skills and Reasoning, be approved as a course in the Core Area A, Essential Skills.

Dorothy Zinsmeister recommended that we include common student learning outcomes as part of that recommendation to the Council on General Education.

Jack Morrell and Cathie Aust presented our discussion of common student learning outcomes for MATH 1101, MATH 1111, and MATH 1113. Discussion also included a change in the course description for MATH 1111. The following motions were made, seconded, and approved by voice vote.

Successful motion: Change the course description of MATH 1111, College Algebra, to read:
This course is a symbolically intensive functional approach to algebra that incorporates the use of appropriate technology. Emphasis will be placed on the study of functions and their graphs, inequalities, and linear, quadratic, piece-wise defined, rational, polynomial, exponential, and logarithmic functions. Appropriate applications will be included.

Successful motion: Approve the following common student learning outcomes for MATH 1101, MATH 1111, and MATH 1113.

MATH 1101 Introduction to Mathematical Modeling

COURSE DESCRIPTION: This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results.

COMMON LEARNING OUTCOMES – After successful completion of the course the student will be able to:

1. Model situations from a variety of settings in mathematical forms by extracting quantitative data from a given situation, translating the data into information in various modes, evaluating the information, abstracting essential information, making logical deductions, and arriving at reasonable conclusions;
2. Manipulate mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic form while solving a variety of problems;
3. Solve multiple-step problems through different (inductive, deductive and symbolic) modes of reasoning;
4. Express mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic form while solving a variety of problems;
5. Shift among the verbal, numeric, graphical and symbolic modes of considering relationships;
6. Use appropriate technology in the evaluation, analysis, and synthesis of information in problem-solving situations.

MATH 1111 College Algebra

COURSE DESCRIPTION: This course is a symbolically intensive, functional approach to algebra that incorporates the use of appropriate technology. Emphasis will be placed on the study of functions and their graphs, inequalities, and linear, quadratic, piece-wise defined, rational, polynomial, exponential, and logarithmic functions. Appropriate applications will be included.

COMMON LEARNING OUTCOMES – After successful completion of the course the student will be able to:

1. Express relationships using the concept of a function and use verbal, numerical, graphical and symbolic means to analyze a function.

2. Model situations from a variety of settings by using polynomial, exponential and logarithmic functions.
3. Manipulate mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic form while solving a variety of problems which involve polynomial, exponential or logarithmic functions.
4. Apply a variety of problem-solving strategies, including verbal, algebraic, numerical, and graphical techniques, to solve multiple-step problems involving polynomial, exponential, logarithmic equations and inequalities and systems of linear equations.
5. Shift among the verbal, numeric, graphical and symbolic modes in order to analyze functions.
6. Use appropriate technology in the evaluation, analysis and synthesis of information in problem-solving situations.

MATH 1113 Precalculus

COMMON LEARNING OUTCOMES – The primary outcome for a student who successfully completes a MATH 1113 course is that the student will have a reasonable expectation of success in a Calculus I course in the University system. In particular, a Calculus I course will anticipate that the student will have a systematic knowledge and understanding of functions. To this end, a student who successfully completes a MATH 1113 course will:

1. Identify the inherent restrictions on the domain of a function;*
2. Identify the range of a function;
3. Understand the interconnectedness of various modes of defining a function (numeric, graphical, generalized)** and be able to analyze functions from numeric, graphical, and symbolic points of view; shift among them when appropriate; and justify this through inductive or deductive reasoning;
4. Be capable through inductive and deductive reasoning of moving from one to another of those modes of definition;
5. Recognize and apply appropriate functions to solve a variety of applied problems.

*Classifications of types of functions that may be encountered to attain these outcomes:

- *piecewise defined*
- *linear*
- *quadratic*
- *general polynomial*
- *rational*
- *exponential*
- *logarithmic*
- *trigonometric*

***Within those modes of definition, a student will:*

- a. (Numeric) be capable of interpolation and extrapolation given various assumptions; apply the periodicity of certain functions and the concept of an inverse as appropriate;*
- b. (Graphical) be capable of manifesting changes in a symbolic definition as a shift, expansion/contraction, reflection; recognize increasing/decreasing and odd/even functions; be capable of moving between standard plane and analytic geometry; apply the periodicity and the concept of an inverse of certain functions;*
- c. (Generalized) be capable of performing the various operations involved in the calculus of functions: addition, subtraction, multiplication, division, composition, developing inverses; simplify and transform expressions; solve systems of equations; develop the periodicity and the inverse of certain functions.*

New Business

A motion was made and seconded to approve the appended response to Vice Chancellor Dan Papp's letter regarding the proposed new Georgia Performance Standards. [The response was revised, circulated, and approved electronically.]

The ACMS approves the appended report of the Ad Hoc Committee on the DOE New Curriculum Standards in Mathematics. The report will be sent to Dr. Zinsmeister by March 5.

A suggestion was made that the ACMS respond to the article in the Feb. 27 Atlanta Journal-Constitution by expressing our serious concerns regarding the new Georgia Performance Standards in mathematics.

Chair Aust thanked all of the committee members who are retiring or finishing their final year of service on the ACMS.

Johan Hattingh reported that Georgia State is considering a Ph.D. program in mathematics and statistics focusing on non-traditional students. He would appreciate a letter of support from any institutions that have faculty who want to upgrade their credentials and might benefit from such a new Ph.D. program.

Jack Morrell thanked Charles Douglas for his exemplary work in organizing the meeting here at South Georgia College.

The meeting adjourned at 12:30 p.m.

Respectfully submitted, Jim Brawner

Quantitative Skills and Reasoning MATH 1001

This course is an alternative in Area A of the Core Curriculum and is not intended to supply sufficient algebraic background for students who intend to take Precalculus or the calculus sequences for mathematics and science majors. This course places quantitative skills and reasoning in the context of experiences that students will be likely to encounter. It emphasizes processing information in context from a variety of representations, understanding of both the information and the processing, and understanding which conclusions can be reasonably determined.

- A. Review Topics: Upon entering MATH 1001, the student is expected to possess an understanding of Introductory and Intermediate Algebra. At most 15% of class time will be spent reviewing the following topics in order to reinforce the students' understanding of them:
1. Geometry (Calculating Lengths, Areas, Perimeters, and Volumes)
 2. Ratio and Proportion
 3. Approximation (Round-off error, significance and accuracy)
 4. Percentages
 5. Relative Value
 6. Computations with Formulae
- B. Uniform Requirements: Between 70% and 90% of class time will be spent covering the following topics:
1. Sets and Set Operations
 2. Logic
 - Negations, Quantifiers, Conditional Statements, Converses
 - Inductive and Deductive Reasoning, Valid Arguments
 3. Basic Probability
 4. Data Analysis
 - Basic Descriptive Statistics (Mean, Median, Mode, Standard Deviation)
 - Correlation, Causality, and Inferences
 - Interpreting Graphical Displays
 - Sampling and Randomness
 5. Modeling from Data (Scatter Plots, Regression Lines)
 - Linear Models
 - Quadratic Models
 - Exponential and Logarithmic Models
- C. Optional Topics: 0% - 20% of the course will cover applications of mathematics to other disciplines such as:
1. Mathematics and the Arts
 2. Mathematics and Politics
 3. Mathematics and Business (networks, etc.)
 4. Mathematics of Finance
 5. Mathematics and Culture

Suggested textbooks:

Using and Understanding Mathematics: A Quantitative Reasoning Approach (3/E) by Bennett and Briggs; Addison-Wesley, 2005.
Mathematics All Around (2/E) by T. L. Pirnot; Addison-Wesley, 2004.