MATH 1351  
Mathematics for Teacher Certification II  

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A full list of committee members can be found at  
http://www.austincc.edu/mthdept5/mman06/cdocs/coursecommittees  

Notes to Instructors  
2006-2007  

Mathematics for Elementary School Teachers: Explorations 3rd ed, Tom Bassarear (0618-34887-5) or shrink-  
wrapped bundle of both (0-618-505393)  

(ISBN0-618-348889-1)  
Computerized Test Bank - Power Point  
(0-618-34893-X);  

Course Purpose:  MATH 1351 is the second semester of a two-semester sequence (1350/1351) designed for  
prospective elementary and/or middle school teachers. This course extends the foundational ideas of mathematics  
so that the prospective teachers (E.C.-8) have an explicit understanding of these concepts. This sequence of courses  
transfers to UT-Austin as M316K and M316L and transfers to other four-year institutions.  

Prerequisite:  Math 1350. Students in MATH 1350/51 must have completed College Algebra or its equivalent  
AND have completed any remediation requirements.  

Core Curriculum:  In 1999, the Texas Higher Education Coordinating Board instituted a new plan to improve the  
transferability of basic courses. Each institution identifies 42-48 hours of "Core" courses that will transfer as a  
block. This must include a mathematics course, but MATH 1350/1351 were not allowed, because they are  
considered specialized courses rather than general courses. This should not be a problem for your students,  
because education majors will take another mathematics course. However, if you have a student in your class who  
is not an education major, please point this out to them. For more information, see  
http://www.austincc.edu/mathsci/ and follow the link to the Core Curriculum.  

State Guidelines and National Standards:  Many organizations are recommending changes in mathematics  
instruction at all levels K-16. The American Mathematical Association of Two-Year College (AMATYC)  
recommends that students in their first two years of college should engage in substantial problem solving, expand  
their mathematical reasoning, and learn to communicate mathematical ideas, in addition to knowing and  
understanding mathematics content. The National Council of Teachers of Mathematics (NCTM) has recommended  
similar changes for the K-12 curriculum. Many elementary teachers are not prepared to teach in a manner  
recommended by NCTM. To assist college instructors in better preparing prospective elementary teacher, the  
Texas Statewide Systemic Initiative Action Team on Strengthening the Mathematical Preparation of Elementary  
Teachers has issued some guidelines for courses such as MATH 1350/1351. These guidelines address content,  
instruction and assessment and are a supplement to the brief notes found in this manual. Committee members listed  
at the top of this document have copies of these documents.  

Internet Addresses of References:  Here is a list of internet addresses for the organizations and documents  
referred to in the above section:  AMATYC,  
http://www.amatyc.org ;  
Crossroads in Mathematics: Standards for Introductory College Mathematics Before Calculus,  
http://www.imacc.org ;  
NCTM,  
http://www.nctm.org ;  
Principles and Standards for School Mathematics,  
http://www.nctm.org/standards/ ;  
Texas State Systemic Initiative,  
http://www.utdanacenter.org/ssi/docs/mathsci.html , from this address you can download the Guidelines  
for the Mathematics Preparation of Prospective Elementary Teachers.
Course Objectives:  MATH 1351 should:
a) increase students' explicit understanding (a level of understanding which allows one to clearly and accurately communicate mathematical ideas) of some elementary mathematics: including representation and interpretation of data; concepts of probability; classifying, creating and analyzing two and three dimensional figures; understanding congruence, transformations, symmetry and tessellations; understanding perimeter, area and volume of geometric figures;
b) increase students' ability to independently increase their own understanding of mathematics (students need to be able to learn math independently and be confident that they understand it since we can't get to everything they will need to teach elementary or middle school students);
c) challenge students' beliefs about mathematics and, hopefully, enhance their attitudes in a positive way;
d) provide students with an opportunity to experience mathematics in a constructivist learning environment, as they may be expected to teach it (for further information on that see NCTM's Professional Standards);
e) introduce common manipulatives; through use, rather than demonstration,
f) begin to develop effective mathematical communication skills.

Environment:  MATH 1351 instructors should foster a classroom environment in which students investigate mathematical ideas and discuss them among themselves. In exchanging ideas within a supportive environment, students are likely to confront their misconceptions and be willing to revise them. Students should be allowed to observe patterns, make generalizations from those observations, and verify these generalizations with sound reasoning. A classroom where students "discover" mathematics rather than being led to mathematical facts more readily meets the course objectives.

Mathematical Tasks: The tasks given to MATH 1351 students should be worthwhile, college-level tasks which help the students have a deeper understanding of mathematics. These tasks should increase their problem solving abilities and help them see the connections among mathematical topics.

Assessment: Skill-oriented exams are not sufficient to garner a clear picture of students' knowledge and understanding of mathematics. Alternate assessments such as written work (both short response and more developed essays/explanations), presentations, portfolios, group activities, etc., reveal more about students' understanding as well as being beneficial to the students' attitudes and providing opportunities for self-assessment. The use of these different assessments is strongly encouraged for MATH 1350/1351. Chapter exams, either as take-home or in-class are still given, but count as a smaller percentage toward overall grade. Several of us see a need to give at least part of one or two exams in class instead of making the chapter exams all take-home. Nancy Miller and Allison Sutton have started doing this, if you would like to talk with either about that.

Most instructors require a skills test on the algebra that students should know when they enter the course, because some students need to refresh previous mathematics knowledge. Ask Nancy Miller nmiller@austincc.edu if you want a few copies of one that has been used by some other faculty members a review sheet can be found on Allison Sutton's web page at http://www.austincc.edu/aasutton Skill-oriented exams can be given in the Testing Center; any exam administered in the Testing Center should have multiple versions.

Manipulatives: Manipulatives should be presented as tools for understanding mathematical ideas. Demonstrating how to use manipulatives to teach mathematical ideas to children is covered in methods courses in the education college of the university. Each campus has different manipulatives available; check with a committee member to see what is available on your campus and where they are located.

Text and Supplements: The text and explorations manual are closely correlated and should be used in tandem. Instructors are encouraged to read the preface of both texts and the Instructor's Resource Manual to get additional insight to the nature of MATH 1351.

Assignments: It is recommended that you assign text problems, text investigations, reflective writing, and explorations. The explorations are good group activities, some of which could be completed in class and a few as out-of-class group or individual activities. These should be assessed regularly and count as a portion of the
semester grade. Be sure to keep up with your grading and feedback to the students. That is very challenging and important in these courses. You will want to streamline the suggested assignment sheet to 24-29 Explorations depending on how many text Investigations you use, how many writing assignments you use, and how time consuming your assessments are. Do not try to do all of the explorations and text problems that are listed.

**Graphing Calculators:** Class sets of TI-73’s, Middle Grades Graphing Calculators are available. Please contact Nancy Miller at NRG, Allison Sutton at RGC or Bob Quigley at CYP if you would like to use them in your class.

**Videos:** You may want to supplement the course with an occasional film. Several used in the past for 1351 include *Flatland*, *The Dot and the Line*, Merits Escher, *Ms. Toliver, Painter of Fantasies* (#QA39.2.k39 1995) in NRG media, 4 videos. Videos on Polygons and Estimation are particularly applicable for MATH 1351. Most of these films can be ordered through the media department in the LRC on short notice.

**Additional Help:** You should be aware that tutors are available for most mathematics courses in the Learning Lab on your campus. Although MATH 1350/1351 are somewhat unusual courses for the tutors, your students should be able to get help with most questions by dropping by the Learning Lab at your campus during most hours of the day and evening.

**First-Day Handout to Students:** You should provide a first-day handout to your students that provides information on the following points:

- a) your name, office number, office hours, office phone, main campus or division phone
- b) all the information on the departmental handout
- c) your grading policies and assessment calendar

**CONCLUSION:** Prospective elementary and middle school teachers appreciate this course more if you show that the concepts in the course are taught in elementary and middle school and are not merely an obstacle to their graduation. If you establish a supportive environment in which they can experience mathematics and acknowledge their interest in children, they can and will work diligently to learn more about mathematics. While this is NOT a methods course, you shouldn't avoid discussing children or teaching children. Some faculty members have an elementary teacher who is enthusiastic about active mathematics learning speak in a class. Keep in mind that MATH 1351 is a college mathematics course, which should be challenging but not overwhelming, aimed at increasing the students' understanding of mathematics concepts.

**Chapter Notes**

**Chapter 7:** (Some faculty members like to do chapter 7 after chapter 10 when they know the students well.) The emphasis of this chapter should be on collecting, representing, analyzing, and interpreting data. Understanding how to perform an experiment (one way to collect data), how to best represent that data, what a statistic is, what a statistic represents or means, and what conclusions can be drawn from the data are more desirable than the knowledge of how to compute statistics that have no meaning. Not that they shouldn't be able to compute, but it should be a secondary goal.

With regard to probability, students should know how to determine theoretical probabilities and understand the relationship between the empirical results and the theoretical results. Counting techniques should be de-emphasized, if time is short section 7.4 could be shortened or omitted.

The students should complete as many of the investigations in the text as is possible. The explorations provide the students opportunities to gather data and they should also complete as many explorations as possible. Some of the explorations should be done (or at least started) during class time, because the students will need to collect data from each other; allow ample time for data collection.

The *USA Today* "Snapshots" are wonderful sources of data. You may want to watch for interesting ones to use in the classroom or for assessments.
Chapter 8: This chapter should emphasize geometry as a mathematical system. Students should focus on understanding the properties of geometric figures, classifying them by those properties and understanding the relationships between figures.

Chapter 9: Students should understand what a transformation is, know the properties of the various transformations, and understand the relationships between the transformations. While exploring the preciseness of the mathematics, this is a good chapter to develop some appreciation for the utility and beauty of geometry. The software program "Tesselmania" (from MECC; there are copies at the NRG computer lab; a demo can be downloaded from http://www.mecc.com/products/lang/tmd/demos.html) could be used during this chapter to allow students to make their own tessellations and explore the mathematics of their creativity. Also, "KaleidoTile" (from the Geometry Center, freeware, available from freabel.geom.umn.edu/software/download/), could be used to generate (less creative) tilings of the plane. The software program "Kali" (from the Geometry Center; freeware; available from freabel.geom.umn.edu/software/download/) creates rosette, frieze, and wallpaper designs; which could be used in conjunction with section 9.2. Section 9.4 on Topology is a new section that has been added in this edition. You may choose to treat section 9.4 lightly. The course outline/calendar has assumed you will treat it lightly. If you choose to do otherwise, you will want to adjust the calendar.

Chapter 10: You should have the students do the explorations for this chapter before beginning the text material. The textbook can be used as a reference for completing the explorations. Have the students do as many of the explorations in Chapter 10 as possible, time may be the limiting factor. Many of the explorations can be done as group assignments outside of class. The groups can then report their results to the class. The instructor's manual has very helpful information. The author has some good suggestions for facilitating the explorations, you should review them prior to beginning Chapter 10. The author also recommends that you not spend class time to develop formulas.

The students should also complete as many of the investigations from the text, again as time permits. While there interesting homework problems in the text, you may want to save those until later and assign them if there is time available after completing the explorations and investigations.
First Day Handout for Students

2006-2007

Math 1351, Math for Middle School Teachers II

Section #, Synonym: 
Time: 
Campus and Room #: 
Semester: 

Instructor Name: 
Office: 
Office Hours: 
Include information for scheduling other times 
Phone: 
Email: 
Web site, if applicable

MATH 1351 MATHEMATICS FOR MIDDLE GRADE TEACHER CERTIFICATION II (3-3-0). Concepts of geometry, probability, and statistics, as well as applications of the algebraic properties of real number to concepts of measurement with an emphasis on problem solving and critical thinking.

Prerequisites: MATH 1350. Students in Math 1350/51 must have completed College Algebra or its equivalent AND have completed any remediation requirements.

Package of both texts, ISBN 0-618-505393

Required Materials:

INSTRUCTIONAL METHODOLOGY
This course is taught through investigations of mathematical ideas through explorations in a supportive, cooperative learning environment.

COURSE RATIONALE
MATH 1351 is the second semester of a two-semester sequence (1350/1351) designed for prospective elementary and middle school teachers. This course extends the foundational ideas of mathematics so that the prospective teachers (E.C.-8) have an explicit understanding of these concepts. This sequence of courses transfers to UT-Austin as M316K and M316L and transfers to other four-year institutions.

COMMON COURSE OBJECTIVES
Common course objectives are attached. They can also be found at: http://www2.austin.cc.tx.us/mthdept2/tfcourses/obj1350.htm
INSTRUCTIONAL METHODOLOGY
This course is taught through investigations of mathematical ideas through explorations in a supportive, cooperative learning environment.

COURSE RATIONALE
MATH 1351 is the second semester of a two-semester sequence (1350/1351) designed for prospective elementary and middle school teachers. This course extends the foundational ideas of mathematics so that the prospective teachers (E.C.-8) have an explicit understanding of these concepts. This sequence of courses transfers to UT-Austin as M316K and M316L and transfers to other four-year institutions.

COMMON COURSE OBJECTIVES
Common course objectives are attached. They can also be found at: http://www2.austin.cc.tx.us/mthdept2/tfcourses/obj1350.htm List these in your individual First Day Handout.

COURSE EVALUATION/GRADING SCHEME:
Grading criteria must be clearly explained in the syllabus. The criteria should specify the number of exams and other graded material (homework, assignments, projects, etc.), with percentage allocations. Instructors should discuss the format and administration of exams. Guidelines for other graded materials, such as homework or projects, should also be included in the syllabus.

Include your policy on Missed Exams, late work, class participation expectations.

Attendance Policy (if no attendance policy, students must be told that). Math Dept's attendance policy follows. Instructors who have a different policy are required to state it. "Attendance is required in this course. Students who miss more than 4 classes may be withdrawn."

Withdrawal Policy (including the withdrawal deadline for the semester)
It is the student's responsibility to initiate all withdrawals in this course. The instructor may withdraw students for excessive absences (4) but makes no commitment to do this for the student. After the withdrawal date, neither the student nor the instructor may initiate a withdrawal.

Incomplete Grade Policy
Incomplete grades (I) will be given only in very rare circumstances. Generally, to receive a grade of "I", a student must have taken all examinations, be passing, and after the last date to withdraw, have a personal tragedy occur which prevents course completion.

Course-Specific Support Services
ACC main campuses have Learning Labs which offer free first-come first-serve tutoring in mathematics courses. The locations, contact information and hours of availability of the Learning Labs are posted at: http://www.austincc.edu/tutor

The following policies are listed in First Day Handout section in front part of the Math Manual. Go to www.austincc.edu/mthdept5/mman06/statements.html Insert the full statement for each of the following in your syllabus:
Statement on Scholastic Dishonesty
Recommended Statement on Scholastic Dishonesty Penalty  
Recommended Statement on Student Discipline  
Statement on Students with Disabilities  
Statement on Academic Freedom

**TESTING CENTER POLICY:** ACC Testing Center policies can be found at:  
[http://www.austincc.edu/testctr/](http://www.austincc.edu/testctr/)  
Instructor will add any personal policy on the use of the testing center.

**STUDENT SERVICES:** The web address for student services is: [http://www.austincc.edu/rss/index.htm](http://www.austincc.edu/rss/index.htm)  
The ACC student handbook can be found at: [http://www.austincc.edu/handbook](http://www.austincc.edu/handbook)

**INSTRUCTIONAL SERVICES:** The web address is: [http://www.austincc.edu/faculty/newsemester/](http://www.austincc.edu/faculty/newsemester/)  
then click on “Campus Based Student Support Overview”.

**COURSE OUTLINE/CALENDAR**

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“Please note: schedule changes may occur during the semester. Any changes will be announced in class.”