**Department of Teacher Education**
**College of Education**
**Florida Atlantic University**
Principles & Methods: Elementary and Middle School Mathematics MAE 4350
Syllabus Fall, 2008

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**Course Title:** Principles and Methods: K-9 School Math
**Course Numbers:** MAE 4350
**Credit Hours:** 3 Semester Hours (Undergraduate level)

## Catalog Description

A review of mathematics information and skills and a study of methods/materials related to K-9 school mathematics teaching in a diverse setting.

**Prerequisites**

- Six to nine semester credits of college level mathematics
- A completed program sheet (Signed by Academic Advisor)
- LAE 4353-Language Arts & Children's Literature,
- TSL 4080-Introduction to TESOL,
- EDF 3610-Education in a Multicultural Society

## Course Connection To Conceptual Framework

The National Council of Teachers of Mathematics is consistent with the College of Education's Conceptual Framework, as some of the goals are to be problem-solvers, flexible, confident, adjustable decision makers applying the mathematical knowledge to be good consumers and informed citizens in our global high-tech society. As a reflective decision-maker the student will make informed decisions, exhibit ethical behavior, and provide evidence of being a capable professional by documenting emergent numeracy development, developing lessons plans that demonstrate respect for the developmental characteristics of young people and needs of ESOL students, and demonstrating the capability to teach and respect all young people.

**Required Text**

Reys, et. Al. (2007). *Helping Children Learn Mathematics. 8th Edition*

**Suggested Resources**

National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*: NCTM: Reston, VA.

State of Florida DOE (2004*). Florida Department of Education Curriculum Frameworks: Mathemati*cs. (World Wide Web: http://www.fim.edu/doe/doehome.htrn.) Ashlock, Robert. *Errors Patterns in Computation.* (2001) .

**Audio/Visual technology**

Overhead Projector, VCR Player, DVD Player, Computer networked to the internet, Document Reader, Calculator

**Guidelines Used in Developing Course Objectives:**

NCATE Recommendations for Technology in Teacher Education
Florida Educator Accomplished Practices - Preprofessional
Florida Educator Accomplished Practices – FAU Preprofessional
Subject Matter Content Standards for Florida's Teachers: K-Grade 9 (Competencies & Skills for Professional Education, (2003)
Subject Matter Content Standards for Florida's Teachers: ESOL = (ESOL)
*Professional Societies and/or Standards:*
National Council of Teachers of Mathematics = (NCTM)

**Course Objectives**

Upon successful completion of this course, the student will be able to:

1. Describe the *Curriculum and Evaluation Standards for School Mathematics* (NCTM and the Florida Sunshine State focus
2. Describe and demonstrate methods of instruction that provide well-balanced instructional lessons, including the importance of informal experiences in introducing concepts, identifying steps in a classroom lesson, and describing ways to facilitate mathematical investigations for all.
3. Explain the role of manipulatives in the teaching and learning of mathematics and describe some commonly used commercial and teacher-made manipulatives for modeling.
4. Demonstrate the use of technology in the teaching of mathematics
5. Describe the role of collaboration, mentors, cooperation, and drill in the teaching of mathematics.
6. Describe the role of verbal and written communication (literature) in the teaching of mathematics
7. Explain alternative forms of assessment that provide insight into the individual's unique learning styles. (K 12)
8. Explain the role of integration, family involvement and resources that provide meaningful math lessons to all children and involve the cultural characteristics of Florida's LEP population including culture/diversity/equity issues/special needs/ESOL.

9. Describe and demonstrate the current NCTM/SSS view of problem solving and describe the problem solving strategies.
10. Describe and demonstrate the current NCTM/SSS view of number sense/estimation/mental calculation and describe lessons and assessment techniques that encourage number sense.
11. Describe and demonstrate the current NCTM/SSS view of geometry & spatial sense, measurement, fractions, decimals, ratios, percents, proportions and number theory in the curriculum.
12. Describe and demonstrate the current NCTM/SSS view of data analysis & probability in today's world and describe activities that encourage students to collect and analyze data as well as predict outcomes.
13. Describe and demonstrate the current NCTM/SSS view of math as the science of patterns and order and describe lessons that involve patterns which lead to algebraic thinking.

**Course Content Outline**

| | | |
|---|---|---|
| Week 1 | Overview of Course, Teaching Influences/Direction | Reys: Chap. 1 |
| Week 2 | Teaching/Planning | Reys: Chap. 2-3 |
| Week 3 | Problem Solving | Reys: Chap. 5 - 6 |
| Week 4 | Alternative Assessment (special needs) | Reys: Chapter 4 |
| Week 5 | Number Concepts, Numeration, and Place Value | Reys: Chapters 7 - 8 |
| Week 6 | Operations and Basic Facts | Reys: Chapter 9-10 |
| Week 7 | Computation | Reys: Chap. 11 Exam 1 |
| Week 8 | Fractions Concepts and Computation | Reys: Chap. 12 |
| Week 9 | Decimals Ratio/Percents/Proportions | Reys: Chap. 13 |
| Week 10 | Geometry / Patterns | Reys: Chap.15 |
| Week 11 | Measurement | Reys: Chap. 16 |
| Week 12 | Technology / Calculators | |
| Week 13 | Algebraic Thinking | Reys: Chap 14 |
| Week 14 | Data Analysis / Statistics / Probability | Reys: Chap. 17 |
| Week 15 | Self-correcting Materials | |
| Week 16 | Final Examination | |

**Assignments**

All assignments should be submitted on the due date, **in class**. If an assignment is due on a day you plan to be absent, notify the instructor prior to the class period. Late assignments will have points taken off. No assignment will be accepted more than **one** week after its due date. **Do not** email your assignments.

You are expected to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling. [Note: Paragraphs are indented.] Your grade will be lowered for errors. Please proofread your work. All assignments should be typed and **double spaced**. All assignments have length guidelines, font size minimum 12. Exceeding those guidelines, even by one line, **will** lower your score a minimum of five points.

K I S S

All assignments must be stapled on the top left corner. A title page is not necessary. **Do not** submit work in folders or report covers.

All references must be completely cited. Internet references must include a **COMPLETE URL.** Ex. http://www.netrox.net/~labush/mae4350.htm

**The exact web page should be easily found online.**

## How To Earn Maximum Points (and learn the most from the course)

Read the text.
Follow the paper and presentation length guidelines.
Proofread and correct spelling/writing errors.
List **one** grade level on assignments asking for grade level.
Submit assignments on time.
Learn the names of the manipulatives and how to use them.
Follow the outline for the lesson plan.
Do the extra credit.
Attend all classes.
Ask questions.

**Please note**: Dr. Labush is very willing when it comes to helping students. You may call him at home. You may also submit questions or assignments for his response via email, **labush@netrox.net** All items must be in the email itself; attachments will not be opened.

**Place MAE 4350 as the subject of all emails. All replies will be within 24 hours.**

**Examinations** - You will have two examinations (Subject Matter and Final) on the material in your textbook **and** on material and topics presented during class.
There are no scheduled make-up exams.
A class review will be given for each exam. Exam reviews will be posted on the website.
**Subject Matter Exam -** The exam covers various math concepts encountered in K – 9. The student will have to solve or estimate and explain the reasoning and/or math process(es) used.

**Critical assignments – The three critical assignments are the Lesson Plan, Problem Solving Journal, and the Subject Matter Exam.**
**Each assignment will be assessed on the 3 – Point Rubric:**

**E** Exceeds Expectations
**M** Meets Expectations
**D** Does Not Meet Expectations

MAE students **must pass each critical assignment with at least "Meets Expectations"** for their program based on the 3-Point rubric.

## Assignments

**Reflection and Problem Solving Journal** Keep a Problem-Solving Journal in a 3 prong (Duotang) notebook. You will receive in class problems and problem-solving assignments throughout the semester to be completed as homework. You are to do each of the problems in your notebook describing all steps, problem-solving process/strategies used, **and especially your problem-solving thinking processes written in detail for full credit**. **Include how you would explain the process to students.** You will be graded on your effort, completion of the problems, and thinking processes. Please feel free to write about feelings and any difficulties you confront as you do the assignments.

**Also**, after reading each chapter write a one paragraph (3 – 5 sentences) **reflection**. You may include your reaction to the text and how it impacts on your teaching and/or student learning.

The problem solving assignments must be organized in chronological order. In a second section, include the chapter reflections in chronological order.

This journal may be hand-written and should be on lined notebook paper.

**Tricks To Trade** - You will be expected to present a *trick* which could be used in teaching mathematics at the K - 9th grade level. This *trick* may be a teaching strategy, game, activity (including arts and crafts, song or movement), student made model, or a model teachers may make and use as part of a lesson. You are to present the *trick* to the class in 3 - 5 minutes. At this time you must fully explain how the *trick* may be used in the classroom, what concept or skill is taught or practiced using the *trick*, and **the grade level** at which you would use it. You may have the class make the *trick or do the activity* as part of the presentation. You must **provide copies** of the directions and/or the materials for your fellow students so they may create the *trick* and/or use it in a lesson. **Each student will be assigned a chapter or topic and a corresponding class when the assignment is due**. Look at the chapter to know what area of math you are assigned. Do not present any activity from the course textbook or the manipulatives for the evening. ***Tricks* are NOT lessons, pencil and paper puzzles, or worksheets.**
Several students will be assigned the same topic/chapter. Please talk to all other presenters for the day you are assigned to be assured everyone is presenting something different.

**Evaluation:** The evaluation will be based on 1) The Activity, 2) The Handout, and 3) Your Oral Presentation.

**Article Summary** You will be expected to review one journal (Arithmetic Teacher, Teaching Children Mathematics, Instructor, and Learning) article about the **teaching** of mathematics. [**Not research**]
Submit a **1 page** typed summary of the article and your reaction to it. The summary should be less than half the paper. Include a **copy** of the journal article **and** include a complete bibliographic reference of the article.

**Lesson Plan** - You will be required to prepare 1 mathematics lesson for whole group instruction. The lesson should be coordinated with the Sunshine State Standards, and focus on active student participation. The lesson *will not* be presented in class. The complete lesson plan outline, including grading criteria, is in the syllabus.
**You may email Dr. Labush your lesson plan for his critique, once.**

## Field Trip Questions

Make believe you are taking your class (K-9) on one field trip. List **20 math questions** you would ask your students related to the trip; before, during, or after the trip. **On top of the assignment, list the field trip and the grade level.**

Questions must include a minimum of 3 questions each involving estimation, computation, problem solving, and collecting/interpreting data (minimum 12) . The remaining 8 questions may include more of the above areas and/or any other areas of mathematics. All questions must make sense and be relevant to the place you are visiting. **List your questions by area of mathematics.** Remember, all mathematical questions do not include numbers or require numbers as answers.

All questions must be identified with the area of mathematics it involves.

Example: Flamingo Gardens Grade 2

1. How long do you think you rode the tram during the trip? (estimation)
2. We saw 3 adult alligators and 4 baby alligators. How many alligators did we see all together? (computation)

## Clinical/Field Observations/Teaching in Elementary/Middle School

(C-F: As a reflective decision-maker the student is able to observe a classroom, reflect upon its climate, students, materials, and activities; and make judgments regarding strengths and weaknesses.)
You will be assigned or use your placement from your General Teaching Practices class to observe math lessons and possibly teach a math lesson, if your cooperating teacher allows you to. You need to apply for a field placement online as follows:
Go to the website: www.coe.fau.edu/OASS/
under the "Field Experience" link you need to complete the form online for EACH course requiring field work. Please be reminded that Palm Beach County School District employees need to complete the same paperwork as those who have never applied for clearance. They will not be recharged, however Palm Beach requires updated forms. If you have questions about your field placement you can e-mail: John Hardman, Director of Field Placements, at: "mailto:whardma1@fau.edu"

**Please apply for a need placement within the first two weeks of the course to ensure it is ready when the time comes to be in the school for observations.**

You may also need to go to the school district office to do your security clearance if doing the placement in Palm Beach County. **If you are a current classroom teacher, you may use teachers at your own school to observe and your own students to teach your lesson required for this assignment.** You will need to spend a total of **ten** hours total in either or both elementary and/or middle school classrooms. While in the clinical setting, you will be asked to complete teacher observation forms(Observing Teacher Forms are found in your MAE Course pack/Blackboard) and possibly teach (Use the FAU Lesson Plan Form found in your MAE Course pack/Blackboard). This will all need to be documented and turned in for full credit. In order to receive the entire **100 points** for this assignment you must return all completed observation forms along with a form which will be provided that documents your dates, occurrences, teacher signature, etc. Students must be prompt during all visitations to school and maintain good communications with their cooperating teacher. One section in your portfolio will contain the documents/observation/lesson plans for this assignment and will be graded at the end of the semester when your portfolio is turned in.

**Clinical Observations/Teaching in Elementary/Middle Schools Grade Sheet**

| Criteria | Possible Points/Received Points |
|---|---|
| Evidence of Completed Hours (Fill out Form) | 40 |
| At least Two math teaching observations (Forms) | 20 |
| Interview with a teacher (Create or Use a forms) | 10 |
| Taught one math lesson--whole/small group (Used the FAU Lesson Plan Form) | 10 |
| Includes 1 Lesson Plan with reflection of lesson (Do an actual reflection of the lesson you taught and include it with the lesson in this section) | 20 |

Total Possible = 100

***Optional Extra Credit  20 points maximum***

**You may complete one assignment**

## Purchase Math Materials for Your Class (20 Points)

You have $500 to spend on math materials for your classroom. All items listed must be found in a catalog or store. Include your source(s) for materials. Think about purchasing materials that will help your students gain mathematical concepts at their grade level. You may purchase manipulatives, games, resource books, activity books, posters, literature books, ???. Do not purchase general school supplies (e.g. pencils, paper, folders). You must purchase a minimum of 16 different items. You must spend between $490.00 and $505.00 and show the total.

**Do not** add sales tax or shipping costs to the total.

On the paper **state your grade level**, and your class has the following number of students:

**Gr. K - 2** 18 students **Gr. 3 - 5** 22 students **Gr. 6 - 8** 28 students

You may use a spreadsheet to list and total your purchases.

**Follow the example below.**

Source - Ace School Supply

| ITEM | QUANTITY | COST EACH | TOTAL |
|---|---|---|---|
| Balance Scale | 2 | 23.00 | 46.00 |
| Student Clocks - Set | 1 Set | 40.00 | 40.00 |

*OR*

**Literature Book Evaluation** (20 Points) Select a literature book that contains one or more math concepts. [Literature books tell a story. Literature books are not counting, problem solving, or activity books.] In a **1 page** typed paper, summarize the book, describe the math concepts(s) explored, how **you** would use the book with a class, and **the** grade level in which **you** would use the book. The summary should be less than half the paper.

Give a complete reference of the book.

**Lesson Plan - Criteria and Scoring**

Plan a lesson for **whole group mathematics instruction** at the K - 9 level, encompassing 30 to 60 minutes of class time. Playing a game, doing a puzzle or practice is not instruction.

**Follow this outline** when writing the plan. The plan should be in outline form (5)

* Identify the students' grade level. (5)
* Clearly state the lesson's **one** objective (or two). Include what the student will be able to do as a result of the lesson. Cite the Florida Sunshine State Standard by letter and number only. (10)
* Describe how the class is to be arranged (rows, groups, separated, ...). (5)
* Describe the procedure to be followed. Consider the good teaching strategies discussed in class. Include lesson initiation (10), core activities (10), and closure activity (10). **Label each part of the lesson.**
* Describe how much time you will spend on each part of the lesson. (10)
  Place the time spent on **each part** of the lesson in parentheses **after its description.** Ex. Read aloud the Three Bears. (10 min.) - Play Salute (10 min.)
  Place the total lesson time at the top of the lesson plan.
* List all materials to be used (text, blackboard, student board, manipulatives, games, worksheets, software, ???). (10)
* Describe what you will do with students who do not understand the lesson. This activity is **not** part of the whole class instruction. This activity must be done during the lesson. Include **one** activity. (10)
* Describe **one** follow-up activity (homework, assessment, tomorrow?). (10)
* Cite **all** references. (text, teacher editions, software, supplemental materials, ?) (5)
  Internet references must have a complete URL spelled correctly [case-sensitive]
  Minimum 3 references.

Refer to Helping Children Learn Mathematics, for further explanations and examples of good teaching strategies

The entire lesson plan, including references, may be no longer than two typewritten pages, (minimum 12 font) double spaced. The appendix is not part of these 2 pages.

**Appendix** - Include all class and homework worksheets, models created during the lesson, game sheets, or any detailed game instructions.

**The lesson plan must be precise enough for a substitute teacher to follow.**

While you should refer to sources for the plan, **do not** copy a plan and submit it as your own. If Dr. Labush finds *your* lesson plan anywhere that is not cited as a reference then the plan will receive **0** points.

Only list what **you will do.** Do not list several things you **could** do.
OMIT any personal rationale for the plan.
OMIT student responses.

**TEACHING METHODOLOGIES:**
Modeling
Guided Practice
Research
Simulations
Lecture
Discussion
Internet communication (use of e-mail, web sites, distance learning)
Presentations by students using a variety of methods and audio visual materials
Use of overhead projector, videos, computer, and other media

**ASSESSMENT PROCEDURES:**
Exams – Subject Matter Exam
Lesson Plan
Problem Solving Journal
"Tricks to Trade" Presentation
Journal Article Review
Math Materials Purchase
Field Trip Questions
Professional Ethics / Meaningful Class Participation / Attendance

| Grading Policy | Pts. |
|---|---|
| Class participation/Manipulatives | 100 |
| Tricks to Trade | 40 |
| Article Summary | 30 |
| Field Trip Questions | 40 |
| Lesson Plan | 100 |
| Problem Solving/Reflection Journal | 100 |
| Field Experience | 100 |
| Subject Matter Exam | 100 |
| Final Exam | 100 |
| TOTAL | 710 |

Optional Assignment 20 points

## See Class Calendar for Due Dates

**FAU Grading Scale**

| | | | | |
|---|---|---|---|---|
| | B+ 87-89 (3.33) | C+ 77-79 (2.33) | D+ 67-69 (1.33) | F 0-59 (0.0 |
| A 93-100 (4.00) | B 83-86 (3.00) | C 73-76 (2.00) | D 63-66 (1.00) | |
| A- 90-92 (3.67) | B- 80-82 (2.67) | C- 70-72 (1.67) | D- 60-62 (0.67) | |

**Attendance Policy**

According to University policy, "Students are expected to attend all of their scheduled University Classes and to satisfy all academic objectives as outlined by the instructor." Attendance includes meaningful, active involvement in all class sessions, class discussions, and class activities as well as professional, ethical, conduct in class. Reasonable accommodations are made for religious observances.

**Students with Disabilities Act Statement**

In Compliance with The Americans with Disabilities Act (A.D.A.) - Students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca - SU 133 (561-297-3880), in Davie - MOD I (954-236-1222),or in Jupiter SR 117 (561-799-8585) and follow all OSD procedures.

**English Students of Other Languages (ESOL) Requirements:**

MAE 4350 Students will apply the following ESOL teaching practices in their lesson plans and math activities for this math methods class:

1. Teach vocabulary using realia and demonstration.
2. Relate math problems and vocabulary to prior knowledge and background.
3. Apply problems to daily life situations.
4. Use manipulatives to make problems concrete instead of abstract.
5. Encourage drawings to translate and visualize word problems.
6. Rewrite word problems in simple English terms.
7. Encourage children to think aloud when solving word problems.
8. Have students give oral explanations of their thinking, leading to solutions.
9. Have students write original word problems to be exchanged with classmates.
10. Explain directions clearly and repeat key terms.
11. Encourage students to follow the four-step problem solving process.
12. Realize that not all math notations are necessarily universal.
13. Group students heterogeneously during cooperatively learning.
14. Be sure that all concepts are taught and understood concretely using manipulatives.
15. Teach math by incorporating cultural and historical aspects for ESOL students.
16. Use technology and computers in pairs with ESOL and non-ESOL students.
17. Total Physical Response----actively involving students while doing math.

**Bibliography**

Direct Link http://www.netrox.net/~labush/BiblioMAE.htm

A link to the class bibliography is online on Dr. Labush's Links to Learning MAE 4350 Page http://www.netrox.net/~labush/BiblioMAE.htm

**Resource**

Dr. Labush's Links to Learning http://www.netrox.net/~labush/

The MAE 4350 Page http://www.netrox.net/~labush/mae4350.htm has links specific to the course.

Many of the overheads used in class may be printed from this page.

Exam Reviews will be linked on this page.

Any changes in the course schedule will be posted there.