Division: Teacher Education
Program Area: Mathematics Education
Course: Problem Solving for Middle School Teachers
MAE/MAT 5130 1401 001 CRN: 26989

Course Credit: 3 Semester Hours

Semester/Year: Winter 2014

Course Location: Room 255 College of Education

Time/Day: 4:30 P.M. – 7:15 P.M. Wednesdays

Instructor: Elsie Babcock E-mail: elsiebabcock@wayne.edu
Office: Room 275 College of Education
Office Phone: 313-577-0922
Office Hours: Mondays 11:15 A.M.-12:15 P.M.
Wednesdays 3:15–4:15 P.M.
Saturdays*
*Please email me if you would like to schedule an appointment during these times.*
Support Staff: Saundra Sumner 313.577.0911

Course Description:
The course is designed to develop and explore mathematical problem solving in middle level education; analyze non-routine problems; examine problem solving habits and strategies; make historical connections; connect elected mathematical content and topics in other disciplines. The course is also designed to support the COE’s theme of an effective educator- The Effective Urban Educator: Reflective, Innovative and Committed to Diversity.

Course content will be explored through readings (including articles), course assignments, cooperative group/hands-on activities (when appropriate), whole and small group discussion and independent assignments using online resources.

Course Objectives
In preparing to become an innovative and reflective urban educator TSW:

1. Use problem solving approaches to investigate and understand and apply mathematical content
2. Investigate problem situations arising in other disciplines and everyday experiences
3. Develop and apply a variety of strategies to solve problems, with an emphasis on non-routine problems
4. Use professional journals, articles and/or resources that support mathematics instruction through reflective research
5. Verify and interpret results with respect to the original problem situation
6. Generalize solutions and strategies to new problem situations
7. Acquire confidence as a mathematical problem solver
8. Monitor and reflect their thinking and performance as a mathematical problem solver
9. Explore problem situations from a historical perspective

Required Text:

Additional Problem Solving Resources
Bresser, R. Math and Literature (4-6) Book Two Math Solutions, ISBN 0-941355-14-4
Burns, M. Good Times Math Event Book. Creative Publications
Burns, M. Math for Smarty Pants. Little Brown and Co.
Erickson, T. Keep It Together. EQUALS.
Professional Opportunities
As a future teacher of mathematics consider joining one or all of the following professional organizations:

NCTM National Council of Teachers of Mathematics nctm.org
MCTM Michigan Council of Teachers of Mathematics mictm.org
DACTM Detroit Area Council of Teachers of Mathematics dactm.org

Class Policies:

1. Regular and punctual attendance and active participation during class is expected. Excessive absenteeism or tardiness can result in the lowering of your grade (if absent or tardy for more than 10% of class sessions). You are expected to complete all assignments on time and be prepared to share work in class. Attendance and participation will be considered in assignment of grades.

   During the semester, students are encouraged to work cooperatively with other students, except during the Exams. The development of a student’s power to use mathematics involves learning the signs, symbols and terms of mathematics. This is best accomplished in problem situations in which students have an opportunity to read, write, and discuss ideas in which the use of the language of mathematics becomes natural. As students communicate their ideas, they learn to clarify, refine, and consolidate their thinking. -Curriculum and Evaluation Standards for School Mathematics

2. Chapters from the required textbook will be assigned each week (refer to the Class Schedule). The assigned readings from the text will help you prepare for class as well as guide your homework assignments.

3. Unless a due date is changed, you must turn the assignment in on (or before) the date it is due. Assignments that are not turned in on time will be recorded as a zero on the due date. Exams must be turned in on or before the date due for full points- no exceptions. If you are unable to take the exam on the date required you must make arrangements to take the exam on campus before the exam date. The instructor will determine the date and time.

4. All assignments must be created as a word document, single spaced, 12-pt. Century Gothic, Arial or Helvetica font and edited carefully for grammar and spelling. Staple document pages at the top left-hand corner. Remember to note the source of ANY materials (books, curricular guides, text, internet) that you use. Students at this University can be expelled for plagiarism.

5. Plagiarism includes copying material (any more than 5 consecutive words) from outside texts or presenting outside information as if it were your own by not crediting authors through citations. It can be deliberate or unintended. If you’re in doubt about the use of a source, cite it. Students caught plagiarizing information from other sources will receive a failing grade in the course. University policy states that students can be subject to multiple sanctions, from reprimand to expulsion as a consequence of academic dishonesty. To enforce this policy, all outside references must be submitted with assignments. Please refer to the information on plagiarism at the following website: http://www.indiana.edu/~wts/wts/plagiarism.html

6. If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.
Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

7. **Withdrawal Policy**

Students who withdraw from a course after the end of the 4th week of class will receive a grade of WP, WF, or WN.

- WP will be awarded if the student is passing the course (based on work due to date) at the time the withdrawal is requested
- WF will be awarded if the student is failing the course (based on work due to date) at the time the withdrawal is requested
- WN will be awarded if no materials have been submitted, and so there is no basis for a grade

Starting in the fall 2011 semester, the last day to add a class without being signed in is the fifth business day instead of the current 10th day. In addition, the last day to withdraw from a class will be the end of the 10th week of class instead of the last day.

Students must submit their withdrawal request on-line through Pipeline. The faculty member must approve the withdrawal request before it becomes final, and students should continue to attend class until they receive notification via email that the withdrawal has been approved.

Based on WSU’s policy students who do not complete course requirements and do not withdraw should receive a failing grade of "F." If a student is failing due to non-attendance, or failure to complete all course requirements, faculty should enter their last date of attendance next to the grade. Students who stop attending and have received financial aid must be reviewed to determine their continued eligibility for aid.

8. **Religious Observance Policy:** Because of the extraordinary variety of religious affiliations represented in the University student body and staff, the Wayne State University calendar makes no provision for religious holidays. It is University policy, however, to respect the faith and religious obligations of the individual. Students who find that their classes or examinations involve conflicts with their religious observances are expected to notify their instructors well in advance so that alternative arrangements as suitable as possible may be worked out.

9. **Utilize your WSU’s student user ID (e.g., aa1104@wayne.edu) for all class communications.** Unless you use your WSU user ID as your email, you will miss any communication sent to you using such email. You may connect your WSU email to another email address by going to [http://webmail.wayne.edu](http://webmail.wayne.edu); click on “Options” and then on “Forwarding.” Enter the email address that you want your WSU email to be forward to and click on “Start.” Email will be the primary source of communication with students when class is not in session; students need to check their WSU email regularly. SKYPE will be used for virtual conferences and/or virtual class sessions when appropriate as well as submitting assignments when you are unable to come to class.

**Evaluation and Grading**

Course grades will be determined based on the following percentages, point distribution/grading scale:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>14%</td>
</tr>
<tr>
<td>Discussion Board</td>
<td>24%</td>
</tr>
<tr>
<td>Exams (2 @ 20% each)</td>
<td>40%</td>
</tr>
<tr>
<td>Metacognitive Journal</td>
<td>22%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>95 - 100</td>
</tr>
<tr>
<td>A-</td>
<td>90 - 94</td>
</tr>
<tr>
<td>B+</td>
<td>87 - 89</td>
</tr>
<tr>
<td>B</td>
<td>80 - 86</td>
</tr>
<tr>
<td>C+</td>
<td>77 - 79</td>
</tr>
<tr>
<td>C</td>
<td>74 - 76</td>
</tr>
<tr>
<td>C-</td>
<td>70 - 73</td>
</tr>
<tr>
<td>F</td>
<td>Below 60</td>
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The College of Education faculty members strive to implement assessment measures that reflect a variety of strategies in order to evaluate a student’s performance in a course. For undergraduates and post-degree students, C grades will be awarded for satisfactory work that satisfies all course requirements, B grades will be awarded for very good work, and A grades will be reserved for outstanding/exemplary performance. For graduate students, B grades will be awarded for satisfactory work that satisfies basic course requirements, B+ grades will be awarded for very good work, and A grades will be reserved for exemplary performance. Please note that there is a distribution of grades from A to F within the College of Education and that pluses/minus are used to distinguish grade point averages.

Assignments
1. HOMEWORK ASSIGNMENTS
   You may expect at least 12 homework assignments. Homework assignments should be organized and clearly labeled. You should show your work that led to your solution and clearly identify the answer(s) for each problem. You should clearly highlight any problems you had difficulty solving or were unable to solve. Include sketches of figure, tables, etc. for each homework item when appropriate. Your homework should provide enough detail so that you will be able to understand how you solved the problem when you revisit the assignment. Students are expected to attempt each of the assigned problems. Even if you are unable to solve a particular problem, your work should show your efforts to reach a solution. I will model several methods for evaluating homework including collecting homework and homework quizzes.

HOMEWORK ORGANIZATION/Criteria
   o When preparing your homework, leave a blank column approximately $\frac{1}{4}$ the width of your paper to make notes. We will check homework assignments at the beginning of class. You are encouraged to make notes in the blank column, as homework is discussed/checked.
   Example:
   
   o Clearly identify each problem. You do not need to rewrite the entire problem, however, you should include a title or statement that identifies each problem.
   o Show your work for each problem.
   o Clearly label or highlight the solution for each problem.
   o Include specific questions that you want me to answer. Questions should be highlighted or clearly noted.

HOMEWORK PRESENTATIONS
   You should plan to volunteer to present at least 2 homework problems to the class. Problems will be presented using the overhead/document camera. This will be an opportunity to practice your presentation skills. Your challenge is to present a thorough but brief presentation therefore
careful planning will be essential. Part of your homework grade will be based on classroom presentations.

Things to think about when you are preparing your homework presentation:
- Present your problem by doing it in part with the class. This means thinking ahead of time about what information you want to have ready on your transparency and what the class will contribute. It may mean covering part of the information on your paper with post-its or another sheet of paper so you can reveal information “as the problem unfolds”.
- Your presentations should model YOUR thinking. This does not mean solving the problem for the first time with the class but rather highlighting the process you used to reach the solution. This will be an important strategy in your classroom.
- Provide information about the problem. For example, you might present the “givens” before you begin to set the stage for the problem.
- Identify (name) specific strategies you used.
- Think about how to make your presentation visually easy to follow including print size, neatness, and color if appropriate.
- Remember you are the teacher when you present so you will want to engage the class. Don’t forget to ask for alternative solutions or strategies and help if needed.

2. DISCUSSION BOARD
During the semester selected readings and activities will be assigned. The readings and activities are intended to extend your understanding of class topics and provide classroom examples that support the teaching and learning of problem solving. Readings are posted in the reading folder on Blackboard and are listed alphabetically by author. You will be assigned to an online discussion group during our first class meeting. Assignments and questions will be posted on Bb. I will “drop in” to visit the discussions, but the purpose of the discussion board is for students to actively engage in conversations with their group members. You will want to think about how you can contribute to our learning community through this online discussion. Discussion board forums will remain posted during the semester for your reference, but you will not be able to submit comments after the deadline date. Therefore, you should plan to make your contributions in a timely manner.

3. EXAMINATIONS
There will be 2 examinations during the semester. Problems on the examinations will be based on homework and in class activities.

4. METACOGNITIVE JOURNAL
This assignment has two parts. The first part provides an opportunity for you to revisit problems you solved during the semester the second part is a self-assessment.

Part I: (12 points)
Choose any 3 problems over the semester for your metacognitive journal. Your journal entries should be typed with the exception of diagrams, charts etc. included with your Solution Strategy. It is expected that your journal entries represent your best professional effort. You should include the following sections for each problem:

- STATEMENT OF THE PROBLEM
  Restate or identify the problem you have selected.
- SOLUTION STRATEGY
  In this section you will have an opportunity to revisit your original solution. Describe the
strategy (or strategies), which you used to solve the problem. For each problem, show how you solved the problem in addition to a narrative that takes the reader through the steps you went through in your mind to come to the solution. You should cite strategies you used to solve the problems, “aha” moments, stumbling blocks, and sources of help or resources. This section should include more detail than you provided in your initial solution.

- **Reflections**
  In this section you will reflect on the process you used to solve the problem. The following questions are intended as a guide for your reflections. What did you do that helped you understand the problem? Did you find any information you didn’t need? Did you think about your answer after you got it? How did you decide your answer was correct? Did you have an “aha” moment? Did you try something that didn’t work? Did you encounter a stumbling block? Did someone in class (or outside of class) say something that gave you an insight into the problem? What did you learn from solving this problem and how will what you learned impact your teaching?

- **Rationale for Problem Selection**
  In this section, you will justify why you selected each problem and provide a thoughtful rationale.

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**Part II: (10 pts)**

- **Self-Assessment**
  This section should be included at the end your journal. And should be 1-2 typed pages in length. The purpose of this section is to reflect on your growth as a problem solver during the semester. In your self-assessment you will document your growth as a problem solver and cite areas where you will continue to seek opportunities to grow professionally. You may want to refer to problems from your journal or other problems/experiences as documentation. You should site discussion board readings and activities where appropriate. You will also reflect on your contributions as a member of our classroom learning community. The following questions are intended to guide your self-assessment. What have you learned this semester that you can apply in your teaching? How will you facilitate problem solving in your classroom? How will you help the reluctant problem solvers in your class? How will you challenge and maintain a high level of motivation for students who are naturally eager to solve problems? I hope that this final opportunity to pause and reflect will be the prelude to exciting problem solving experiences in your classroom!