The mission of the Aquinas College School of Education is to facilitate the development of competent, compassionate, and committed educators of integrity.

COURSE SYLLABUS AND CALENDAR FOR
Master in Science Education 530
Geosphere
(Semester, Year)

I. Identifying Information

Location/Time:
Instructor:
Home Number:
Work Number:
Fax Number:
E-mail Address:
Office Hours:

Prerequisites: None

II. Textbooks and Instructional Materials

Required Texts:

National Academy Press.

III. Course Description

This is a course for certified teachers to strengthen competencies in the teaching of Science at elementary and middle school levels. This course will emphasize science content and model science teaching methods. Learning in this course is constructive, inquiry-driven, and project-based. Participants will work in small groups, perform investigations, discuss concepts and results, keep journals, utilize technology such as the internet, CD-ROMS, and DVD’s, as well as learn how to effectively utilize inexpensive, readily available materials and explore local resources.

All course objectives are aligned with the Michigan Core Curriculum standards and benchmarks and teachers will learn those methods needed to prepare students for success in learning science, excelling in state prepared assessment instruments, and pursuing technological and scientific careers.
Concepts presented in this course are necessary to understand how the earth works as an active planet, and how this knowledge is crucial to our lives. It will also investigate the influence of geology on the very existence of life on earth, the dependence of all human civilizations on rocks and minerals, the limits of the earth’s resources, and the fragile nature of the earth’s environments in which we live. The course includes constructivist activities and long-range collaborative projects.

IV. **Course standards/learner outcomes**

This course includes these Standards for the Preparation of Teachers of Integrated Science from the Michigan state Board of Education August 8, 2002:

This course helps prepare teachers to:

- use the Michigan Curriculum Framework K-12 Science Content Standards and Benchmarks as the critical foundation for teacher preparation, ensuring that elementary integrated science teachers have the content knowledge and the ability to teach this curriculum; and
- develop an understanding of the interconnectedness of all science, along with major unifying themes, and relates this understanding to the teaching of science; and
- understand and teach earth science as integrated content.

The preparation of elementary integrated science teachers will enable them to:
understand and develop the major concepts and principles of earth science which may include such topics as the following:

**Earth/Space Science, including**

- lithosphere and historical geology
- hydrosphere
- resource management

V. **Michigan Entry Level Standards addressed in this course**

- Create learning environments that promote critical and higher order thinking skills, foster the acquisition of deep knowledge, and allow for substantive conversation with the teacher and/or peers about subject matter;
- Engage students in practical activities that demonstrate the relevance, purpose, and function of subject matter to make connections to the world beyond the classroom;
- Plan and use different cognitive, affective, and psychomotor strategies to maximize learning and to accommodate differences in the backgrounds, learning styles, disabilities, aptitudes, interests, levels of maturity, and achievement of students;
- Use a variety of teaching methodologies and techniques, e.g., lectures, demonstrations, group discussions, cooperative learning, small-group activities, and how to assess one’s effectiveness in utilizing them;
- Identify and use current research in both the subject field and in other areas of practice in the profession;
• Maximize the use of instructional time by engaging students in meaningful learning experiences;
• Use community and home resources to enhance school programs;
• Demonstrate an understanding of, and continued growth in, information age learning and technology operations and concepts;
• Plan and design effective technology-enhanced learning environments and experiences aligned with the State Board’s policy on learning expectations for Michigan students and the Michigan Curriculum Framework for all students;
• Implement curriculum plans that include technology-enhanced methods and strategies to maximize student learning;

VI. **Methodology and Course Requirements**

**Reaction/Reflection Papers:**
Learners will be required to prepare a one to two page, typed and professionally constructed paper as assigned. In this paper the learner will reflect on class activities, readings, respond to questions raised, present personal reactions, and positions on issues identified, suggest improvements, express feelings, and propose problems.

**Lesson Plans:**
Learners will be required to prepare a fully developed lesson plan following the Aquinas College School of Education Format for each Geosphere Objective at the elementary and middle school. These lesson plans can be original or modified to suit from any source. Each lesson should be inquiry based, and include a student lab sheet. Lessons will also demonstrate logical and effective integration of science content and include student activities in the procedures which follow constructivist approaches to learning and utilize investigative, inquiry based learning experiences. (See the lesson plan criteria below). Lessons also need to take into account the principles of maintaining a safe science classroom as identified by the Council of State science Supervisors at [http://www.csss.science.org/safety.shtml](http://www.csss.science.org/safety.shtml)

**Presentations:**
Learners will prepare an experiment or activity for each specific benchmark within their age level. It will probably be the same as the lesson plan you developed for that benchmark. Participants will also be required to prepare and present a minimum of two lessons demonstrating constructivist teaching strategies and competence in the practice of teaching through investigative experiences.

**Unit Project:**
Learners will develop a unit project, which addresses one of the Geosphere Benchmarks, or the entire unit. It will demonstrate synthesis of the material presented during the course, and may be developed as a classroom unit plan, learning center, culminating activity, unit assessment, or other format immediately useful as a major part of a Geosphere Unit in your classroom. The project must be thoroughly developed, utilize the principles of a safe science classroom as identified by the Council of
State Science Supervisors, be aligned with MiClimb, and utilizing inquiry learning. The unit must also demonstrate logical and effective integration of science content and liberal use of investigative, inquiry activities to promote scientific thinking and attitudes in students.

Notebook:
Learners will keep a three ring binder that is to include all of the above work, and be organized by the Geosphere Benchmarks.

VII. Assessment Tools Used and Criteria for Evaluation and Grading

Reaction/reflection papers must:
1. Be one to two pages
2. Contain minimal grammatical and or conventional writing errors
3. Be a thoughtful reflection or reaction to the readings, activities, assignments, and discussions from weeks before.
4. Include any questions or burning issues which need to be addressed at the next session
5. Be well organized.
6. Be typed and double spaced.

Lesson Plans:

Criteria

<table>
<thead>
<tr>
<th>Standards</th>
<th>Standards are clear with strongly worded expectations at higher level thinking skills. Standards include an effective and logical integration of science content.</th>
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</thead>
<tbody>
<tr>
<td>Rationale</td>
<td>Rationale is compelling for teaching this lesson and related to accepted standards. Rationale supports and justifies the integration of science content in the lesson.</td>
</tr>
<tr>
<td>Materials and Resources</td>
<td>Materials and resources list is complete and comprehensive indicating where materials and resources might be found.</td>
</tr>
<tr>
<td>Assessment</td>
<td>Assessment is valid and reliable with close alignment to standards and instruction and including clear scoring rubrics or criteria checklists.</td>
</tr>
<tr>
<td>Introduction</td>
<td>Introduction is engaging for all students and informs students of the lesson outcome/standard to be accomplished.</td>
</tr>
<tr>
<td>Procedures</td>
<td>Procedures are creative, logically sequenced, engage all students all of the time and utilize vocabulary and instruction in thinking skills</td>
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consistent with the standards to be taught. Procedures model constructivist approaches to the content and incorporate investigative, inquiry based activities for the learners.

Guided Study/Homework
Guided study and homework is meaningful and directly related to the standards required.

Closure
Closure is engaging and requires emotional reflection, personal connection or metacognition by the learners.

Evaluation/Reflection
Reflection and evaluation of the lesson by the instructor is thorough and comprehensive identifying specific strengths and specific areas that need improvement.

Culminating Unit Projects:
Credit will be given and scored according to the rubric supplied or designed collaboratively with the student and the instructor.

Assessment is based on the belief that quality work is the goal. Full points will be awarded in all cases when criteria have been met. Re-submissions are expected for all assignments not meeting all criteria.

VIII. Support Services and other Requirements

Academic Dishonesty: Written or other work that a student submits must be the product of her/his own efforts. Plagiarism, cheating and other forms of academic dishonesty, including dishonesty involving computer technology, are prohibited. Further information on Academic Dishonesty can be found in the current college catalog.

IX. Tentative Calendar of Class Meetings

| Session 1 | Introduction, course overview, MiClimb, outline/concept map, class objectives. |
| Session 2 | Inquiry, Chapter 1,2,3 / Rocks and Minerals |
|           | Conceptual change unit |
| Session 3 | Inquiry, Chapter 4,5,6 / Rocks and Minerals |
|           | Inquiry unit planning |
| Session 4 | Fossils |
| Session 5 | Fossils/Geological Time |
| Session 6 | Surface Features/Maps, maps of the earth for water |
| Session 7 | Earth’s Surface |
Session 8  Water cycle; oceans Natural Changes
Session 9  Water cycle; atmosphere
Session 10  Ground water, hydrosphere pollution
Session 11  Earth’s surface natural Changes
Session 12  Mechanisms for natural changes
Session 13  Effects of natural changes
Session 14  Earth’s Resources
Session 15  Recycling/Technological Changes
Session 16  Presentation of Projects

X. Resources/Reference List

Refer to the Council of State science Supervisors at http://www.csss-science.org/safety/shtml for information on maintaining a safe science classroom.