SOUTHEAST MISSOURI STATE UNIVERSITY
COURSE SYLLABUS

Department of Geosciences       Course No.   GO618
Title of Course: Topics in Earth Science Education    New:  Summer 2001

I. Catalog Description and Credit Hours of the Course

An examination of pertinent topics in the earth sciences coupled with pedagogical models and investigative experiences appropriate for teaching in the elementary or secondary classroom. This course is not intended for students with an undergraduate or graduate geoscience major. (3)

II. Prerequisites

Graduate student status and permission of instructor.

III. Purposes or Objectives of the Course

1. To strengthen the earth science background of those desiring to increase their effectiveness as science teachers, science coordinators or department chairs, and/or curriculum designers.

2. To emphasize earth science content reflected in the National Standards and the Missouri Frameworks.

3. To expose students to a variety of teaching strategies, especially those that involve active, investigative experiences in the classroom

IV. Expectations of Students

1. To successfully complete all course assignments.

2. To actively participate in all class activities, projects, and discussions.

3. To attain satisfactory scores on examinations.

4. To successfully complete an out-of-class project that will entail the development of a detailed Instructional Plan for a selected unit within the earth sciences for a selected grade level.
V. Course Content or Outline

NOTE. For the sake of brevity (i.e., to keep from repeating the same statements 16 times) please note that: (a) each class meeting (week), except for the last, will end with the assignment of an out-of-class activity related to the topic covered during that class; (b) each class will end with an assigned reading that addresses the topic to be covered in the next class; (c) each class, except for the first, will begin with a review of the previously assigned out-of-class activity; and (d) each class will include the completion of in-class, hands-on activities related to the topic of that class.

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<thead>
<tr>
<th>Week</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction; Geology: Earth Materials – Minerals</td>
<td>3</td>
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<tr>
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<td>Course introduction and overview that includes student expectations and requirements • Minerals – the building blocks of rocks • Common rock-forming minerals</td>
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<td>2</td>
<td>Geology: Earth Materials – Rocks and Soil</td>
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<td></td>
<td>Igneous rocks • Sedimentary rocks • Metamorphic rocks • Soil</td>
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<td>3</td>
<td>Geology: Plate Tectonics – The Unifying Theme of the Earth Sciences</td>
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<td>Plate tectonics video • Overview of plate tectonics with expanded discussion of important specifics</td>
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<td>4</td>
<td>Geology: Constructive (Internal) Forces</td>
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<td>Role of constructive forces in shaping the earth’s surface • Vulcanism • Faulting and earthquakes • Orogenic activity • Epeirogenic activity</td>
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<tr>
<td>5</td>
<td>Geology: Destructive (External) Forces</td>
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<td>Role of destructive forces in shaping the earth’s surface • Weathering • The agents of weathering • Erosion • The agents of erosion</td>
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<td>6</td>
<td>Geology: Earth History and Geologic Time</td>
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<td>The geologic time scale • Relative and absolute dating of events and materials • Techniques of relative dating • Interpretation of past events using relative dating</td>
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<td>7</td>
<td>Geology: Earth History and Fossils</td>
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<td>Nature of fossils • Methods of fossils preservation • Index fossils • Using fossils to understand earth history • Common southeast Missouri fossils • Dinosaurs</td>
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<td>8</td>
<td>Midterm Exam; Oceanography: Water Motions in the Beach Environment</td>
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<td>Midterm exam • Shallow water waves • Formation of breakers • The surf zone • Swash, backwash, and undertow • Longshore and rip currents • Tidal movement</td>
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9 **Oceanography: Beach Characteristics**
Beach morphology • Beach composition and controls • Beach texture and controls • Beach width and controls • Beach slope and controls • Seasonal changes in beach characteristics

10 **Oceanography: Life in the Oceans**
Ocean food chain • Ocean-life video • Swimmers and floaters: pelagic biozones • Bottom dwellers: benthic biozones • Coral reefs and the reef environment • Common beach organisms

11 **Meteorology: Nature of Air**
Composition of the atmosphere • Air as a physical substance • Weight and density of air • Volume of air • Fluid nature of air • Compressibility of air • Gas laws

12 **Meteorology: Air Pressure and Winds**
Nature of air pressure • Measuring air pressure • Expressions of air pressure • Basic pressure (weather) patterns • Scale of pressure patterns • Effect of pressure patterns on sky conditions • Relation between air pressure differences and wind movement

13 **Meteorology: Severe Storms**
Thunderstorms, hail, and lightning • Tornadoes • Infamous U.S. tornadoes • Hurricanes • Infamous U.S. hurricanes • Severe storms video

14 **Astronomy: Our Solar System**
Members of the solar system: sun, planets, moons, asteroids, comets, and meteoroids • Distances within the solar system • Scaling the planets down to size • Phases of the moon • Eclipses

15 **Astronomy: StarLab Planetarium and Constellations**
Nature of constellations • Techniques for finding constellations • Learning and locating common constellations in the StarLab Planetarium

16 **Astronomy: Galaxies and Beyond; Final Exam**
Nature of galaxies • Types of galaxies • Scaling galaxies and the universe down to size • Final exam

**VI. Textbook and/or Other Materials or Equipment Required**

VII. Basis of Student Evaluation (grades)

Participation in class activities 10%
Assigned out-of-class activities 15%
Concept Activity Plan 25%
Exams 50%

VIII. Programs Served by this Course

Required core course of the MNS in Science Education degree option.

MNS in Biology, Chemistry, or Physics for students with an interest in education and/or who select Education or Science Education as their complementary area.

MA in Elementary or Secondary Education for students with an interest in science education.