



## Colorado Mountain College

### **I Course and Instructor:**

***Format:*** Lecture, Laboratory and Field

***Course Information:***

|                                       |                                    |                               |                       |
|---------------------------------------|------------------------------------|-------------------------------|-----------------------|
| <b><i>Course Title:</i></b>           | Physical Geology                   | <b><i>Credits:</i></b>        | 4.0                   |
| <b><i>Location:</i></b>               | <b><i>Course Code:</i></b>         | <b><i>Synonym Number:</i></b> |                       |
| Edwards                               | GEY-111-VE02                       | 70331                         |                       |
| <b><i>Semester:</i></b>               | Fall, 2012                         | <b><i>Prerequisite:</i></b>   | College Level Reading |
| <b><i>Meeting Times and Days:</i></b> | 3:00 – 5:50 PM, Tuesday & Thursday |                               |                       |
| <b><i>Class Location:</i></b>         | Rm. 216, Edwards Campus            |                               |                       |
| <b><i>Start Date:</i></b>             | Tuesday, 08/28/12                  | <b><i>End Date:</i></b>       | Thursday, 12/13/12    |
| <b><i>Refund Date:</i></b>            | Thursday, 09/13/12                 | <b><i>Withdraw Date:</i></b>  | Friday, 11/16/12      |

***Instructor Information:***

J.P O'Brien  
***Phone:*** (970) 569-2900 (during class-time)  
***CMC FAX:*** (970) 569-2951  
***E-Mail:*** [jpobrien@coloradomtn.edu](mailto:jpobrien@coloradomtn.edu)  
***Office Hours:*** Email for teleconference appointment

### **II. Course Description:**

This course studies the materials of the earth, its structure, surface features and the geologic processes involved in its development. This course includes laboratory experience. This course is one of the Statewide Guaranteed Transfer courses. GT-SC1. This course includes field trips as laboratory experience. The field trip dates and times will be determined after the class meets for the first time.

### **III. Course Objectives:**

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

- I. Recognize and appreciate the vastness of geological time and illustrate this by example and/or metaphor.
- II. Recognize and classify the common minerals and rocks by their observable characteristics.
- III. Locate and identify geologic features using topographic and/or geologic maps.
- IV. Discuss the origin of intrusive and extrusive igneous rocks and recognize landforms associated with each.
- V. Understand the weathering processes involved in the transition from bedrock to soil and sediment.
- VI. Discuss the processes involved in the formation of sedimentary rocks and relate them to modern and ancient depositional environments.

- VII. Understand the agents and processes of metamorphism and relate these to the various metamorphic rocks.
- VIII. Analyze the causes and effects of earthquakes and relate seismology to the structure of the earth.
- IX. Describe the hydrological cycle and relate this concept to both the surface and subsurface waters.
- X. Discuss the mechanics of Earth's waters (e.g., running water, waves, tides and currents, groundwater), mass wasting, wind and glacial ice and relate these agents and processes to the origin of landforms.
- XI. Classify folds, faults, and mountains and discuss their origin.
- XII. Discuss the basic lines of evidence for continental drift, sea floor spreading, and plate tectonics.
- XIII. Discuss the characteristics of plate boundaries and heat plumes and their relationships to earthquakes, volcanic and mountain building activities.
- XIV. Read, analyze and apply written material to new situations.
- XV. Write and speak clearly and logically in presentations and essays.
- XVI. Demonstrate the ability to select and apply contemporary forms of technology to solve problems or compile information.

#### IV. **IDEA Student Ratings of Instruction:**

In addition, each semester students have the opportunity to evaluate the course and instructor through the IDEA evaluation. The instructor will address the following competencies:

- 1. Gaining factual knowledge (terminology, classifications, methods, and trends). *Essential*
- 2. Learning fundamental principles, generalizations, or theories. *Essential*
- 3. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course. *Important*
- 4. Acquiring skills in working with others as a member of a team. *Important*

#### V. **Evaluation Methods and Class Management:**

The letter grade for this course will be assigned on a weighted system. Students will be graded using a point system, lecture and lab portions of the course will be combined to derive a final grade.

Assignments:

Lecture:

- 1. Reading assigned text chapters before class, for the performance of approximately 17 on-line quizzes, 35 to 50 points each. Lecture, reading and on-line quizzes are due 7 days after assigned and will not be accepted after their due date.
  - 2. Two multiple choice take home (open book) Practice tests, approximately 60 points each. Practice tests are due the class day before the Mid-term and Final exam, Practice tests will be graded in class
  - 3. A multiple choice Mid-term Exam, 100 points.
  - 4. A multiple choice Final Exam, 100 points.
- There will be no make-up dates for the mid-term or final.

5. There will be no “extra credit” for this class.

**Lab:**

Approximately one hour of class per week will be spent conducting various laboratory investigations. Students may need additional time to complete assignments. Lab exercises will vary from 10 to approximately 60 points dependent upon degree of difficulty.

Approximately 15 lab assignments will generally be assigned on Tuesdays and will be due on the following Tuesday. When assignments are turned in they are final, no additions will be accepted. Late lab assignments will be graded with a 20 percent mark down; lab assignments will not be accepted 7 days after their due date. The students name and date should be shown on every page of each lab assignment. Lab assignments may not be turned in via email unless specified or approved by instructor.

**Attendance:**

Attendance to all classes is expected. Students will receive 5 points per class, and 50 points per field trip for attendance, these points cannot be made up.

*Tentative Schedule*

*NOTE: This schedule is subject to change at any time, depending on instructor evaluation of student skills/understanding/knowledge*

|                |  |
|----------------|--|
| Tuesday, 8/28  | Introductions, review of Syllabus and text.<br>➤ Read Chapter 1,<br>Lab 1, Contour Mapping   |
| Thursday, 8/30 | The Scientific Method.<br>➤ Earth systems,<br>➤ Geologic time<br>➤ Read Chapter 2, Take home questions   |
| Tuesday, 9/4   | Introduction to Plate Tectonics,<br>➤ Divergent and Convergent plate boundaries,<br>➤ Rates and history of plate motions<br>➤ Read Chapter 2, Take home questions<br>Lab 2     |
| Thursday, 9/6  | Introduction to Plate Tectonics, cont.<br>➤ Lab 2<br>➤ Read Chapter 3  |
| Tuesday, 9/11  | Earth Materials, Rocks and Minerals<br>➤ Physical and chemical properties of minerals<br>➤ Igneous, Sedimentary, and Metamorphic rocks<br>➤ Take home questions<br>Lab 2 and 3 |
| Thursday, 9/13 | Lab 3 in class.<br>➤ Lab 4,<br>➤ The Rock cycle,<br>➤ Read Chapter 4   |

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| Tuesday, 9/18   | <p>Earth materials, Igneous rocks.</p> <ul style="list-style-type: none"> <li>➤ Magmas</li> <li>➤ Igneous activity and Plate Tectonics</li> <li>➤ Read Chapter 5, Take home questions</li> </ul> <p>Lab 5</p>   |
| Thursday, 9/20  | <p>Earth materials, Sedimentary rocks.</p> <ul style="list-style-type: none"> <li>➤ Detrital rocks</li> <li>➤ Chemical and Biochemical rocks</li> <li>➤ Earth History</li> <li>➤ Sedimentary Environments</li> <li>➤ Sedimentary Structures</li> <li>➤ Sedimentary Basins</li> <li>➤ Read Chapter 6, Take home questions</li> <li>➤ Last day for full refund.</li> </ul> <p>Lab 5</p> |
| Tuesday, 9/25   | <p>Earth Materials, Metamorphic rocks</p> <ul style="list-style-type: none"> <li>➤ Foliated and non-foliated rocks</li> <li>➤ Types of Metamorphism,</li> </ul> <p>Lab 6 &amp; 7</p>  |
| Thursday, 9/27  | <p>Earth Materials, Sedimentary &amp; Metamorphic rocks.</p> <ul style="list-style-type: none"> <li>➤ Lab 6 &amp; 7 in class</li> <li>➤ Read Chapter 7,</li> </ul>  |
| Tuesday, 10/2   | <p>Structural Geology</p> <ul style="list-style-type: none"> <li>➤ Faults and Folds</li> <li>➤ Mountain building</li> <li>➤ The Ancestral Rockies, Laramide and more recent orogenies</li> <li>➤ Take home questions</li> </ul> <p>Lab 10, Faults and Folds</p>   |
| Thursday, 10/4  | <p>Structural Geology</p> <ul style="list-style-type: none"> <li>➤ Read Chapter 21</li> </ul> <p>Lab 10 in class</p>  |
| Tuesday, 10/9   | <p>Glaciation.</p> <ul style="list-style-type: none"> <li>➤ Origin and Classification of Glaciers</li> <li>➤ Effects of Glacial Movement</li> <li>➤ Take home questions</li> <li>➤ Erosional Landforms</li> <li>➤ Depositional Landforms</li> <li>➤ Lab 13</li> </ul>   |
| Thursday 10/11  | <p>Field Trip, Mandatory, meeting times and destinations will be discussed in class.</p> <ul style="list-style-type: none"> <li>➤ Practice Take home test</li> </ul>  |
| Tuesday, 10/16  | <p>Grade and Review Practice Take Home Test in class</p> <ul style="list-style-type: none"> <li>➤ Study for Mid-Term</li> </ul>   |
| Thursday, 10/18 | <p><b>Mid-Term</b></p>  |

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| Tuesday, 10/23  | <p>Volcanism</p> <ul style="list-style-type: none"> <li>➤ Eruptive Styles</li> <li>➤ Global Pattern of Volcanism</li> <li>➤ Read Chapter 12 &amp; 16 Take home questions</li> </ul>  |
| Thursday, 10/25 | <p>Weathering Erosion and Mass Wasting</p> <ul style="list-style-type: none"> <li>➤ Types of Down-slope movement</li> <li>➤ Causes of Down-slope movement</li> <li>➤ Take home questions</li> </ul> <p>Lab: Take Home Assignment</p>   |
| Tuesday, 10/30  | <p>Field Trip, Mandatory, meeting times and destinations will be discussed in class.</p> <ul style="list-style-type: none"> <li>➤ Read Chapter 8</li> </ul>  |
| Thursday, 11/1  | <p>Geologic Time</p> <ul style="list-style-type: none"> <li>➤ Relative and Absolute time</li> <li>➤ Read Chapter 8, Take home questions</li> <li>➤ Read Chapter 10</li> </ul> <p>Lab 8</p>   |
| Tuesday, 11/6   | <p>Evolution of the Continents</p> <ul style="list-style-type: none"> <li>➤ Tectonics of North America</li> <li>➤ Take home questions</li> <li>➤ Read Chapter 13</li> </ul>  |
| Thursday, 11/8  | <p>Earthquakes and Earth's Interior</p> <ul style="list-style-type: none"> <li>➤ Exploring Earth's Interior- Seismic Waves</li> <li>➤ Earthquakes and faulting</li> <li>➤ Read Chapter 17, Take home questions</li> </ul> <p>Lab 16</p>  |
| Tuesday, 11/13  | <p>The Hydrologic cycle.</p> <ul style="list-style-type: none"> <li>➤ Porosity, Permeability, and the Water Table</li> <li>➤ Springs, Artesian and Hydrothermal systems</li> <li>➤ Groundwater</li> <li>➤ Surface water</li> <li>➤ Aquifers</li> <li>➤ Read Chapter 18, Take home questions</li> </ul> <p>Lab 12</p> |
| Thursday, 11/15 | <p>Stream Transport.</p> <ul style="list-style-type: none"> <li>➤ Stream Valleys, Channels</li> <li>➤ Water and Erosion, Transportation, and Deposition</li> <li>➤ Drainage patterns and systems</li> <li>➤ Read Chapter 18, Take home questions</li> </ul> <p>Lab 12 &amp; 11</p>                                   |
| Tuesday, 11/20  | <p>Lab 12 &amp; 11 in class</p>  |
| Thursday, 11/22 | <p>Campus closed, Thanksgiving Break</p> <ul style="list-style-type: none"> <li>➤ Read Chapter 19</li> </ul>   |
| Tuesday, 11/27  | <p>Winds and Deserts.</p> <ul style="list-style-type: none"> <li>➤ Causes and Locations of Deserts</li> <li>➤ Origin of desert landforms</li> </ul>  |

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|                 | <ul style="list-style-type: none"> <li>➤ Erosional and Depositional eolian effects</li> <li>➤ Read Chapter 19, Take home questions</li> </ul>   |
|                 | Lab 14  |
| Thursday, 11/29 | The Solar System  |
|                 | <ul style="list-style-type: none"> <li>➤ Origin of the Solar system</li> <li>➤ Diversity of the Planets</li> <li>➤ Read Chapter 23, Take home questions</li> </ul>                      |
| Tuesday, 12/4   | The Human Impact on Earth's Environment   |
|                 | <ul style="list-style-type: none"> <li>➤ Fossil-Fuel Resources</li> <li>➤ Alternative Energy Resources</li> <li>➤ Global Change</li> <li>➤ Practice test take home questions</li> </ul> |
| Thursday, 12/6  | Overview  |
|                 | <ul style="list-style-type: none"> <li>➤ Review Practice Test</li> <li>➤ Review, Q &amp;A</li> <li>➤ Questions</li> </ul>   |
| Tuesday, 12/11  | Lab Final   |
| Thursday, 12/13 | Lecture Final Exam  |

#### NOTICE:

A student judged to have engaged in academic misconduct as defined in the "Academic Policies and Requirements" section of the Colorado Mountain College Student Handbook will, at a minimum, receive a "zero" for the work in question. The student may also be removed from the class, resulting in a failing grade. All student course material may be submitted to SafeAssign (or another anti-plagiarism program) at the instructor's discretion. "Academic Expectations," the "Student Code of Conduct and Judicial Process" and more information about academic misconduct can be found in the Student Handbook, online version at:

[www.coloradomtn.edu/UserFiles/Servers/Server\\_2935393/File/student\\_handbook.pdf](http://www.coloradomtn.edu/UserFiles/Servers/Server_2935393/File/student_handbook.pdf).

Students are responsible for course materials from assigned text(s) and reading, lectures, labs, and other assignments as required.

The instructor may alter any, or all, of this syllabus during the semester as the learning environment requires. Students will be notified in writing of changes.

If you have a disability protected by the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act and feel you may need classroom accommodations based on the impact of your disability, please contact the Disability Services Coordinator on your campus.

- Edwards and Steamboat Springs: Deb Farmer at 970-870-4450
- Aspen, Carbondale, Glenwood Springs (including Spring Valley), and Rifle: Dr. Anne Moll at 970-947-8256
- Breckenridge, Dillon, Leadville, and Chaffee County: Sandi Conner at 719-486-4200

Students wishing to withdraw from this course must INITIATE the course withdrawal/drop process at the site Registration Office.

This class could be cancelled one week prior to the census date if a sufficient number of students are not enrolled by that date.

Attendance at all class meetings is expected.

## **VI. Grading System:**

Information about the CMC grading scale is available in the College Catalog. You will receive a grade report for current semester courses at the end of each term. This grade report is mailed to your permanent mailing address. Reports are mailed approximately two weeks after the end of the academic term. Additional information is available at: [http://coloradomtn.edu/UserFiles/Servers/Server\\_2935393/File/CMC\\_Catalog\\_11-12.pdf](http://coloradomtn.edu/UserFiles/Servers/Server_2935393/File/CMC_Catalog_11-12.pdf) pages 14-15.

## **VII. Required Course Materials**

### **Text:**

Grotzinger, J., Jordan, T., 2010, Understanding Earth, sixth edition, W.H. Freeman and Company, N.Y. (ISBN-13: 978-1-4292-1951-8) (ISBN: 1-4292-1951-3)

### **Lab Manual:**

Laboratory Manual in Physical Geology, ninth edition, Richard M. Busch ed., 2011, Prentice Hall, ISBN-10: 0-321-6897-7, ISBN-13: 978-0-321-68957-3

### **Lab Kit:**

Will be provided, for in class check out only.

**Materials:** Text, Lab Book, Calculator, Pencils, Hiking Boots, Back pack, Water Bottle.

## **ORDERING BOOKS**

Colorado Mountain College has chosen to partner with Follett Virtual Bookstores to operate textbook services.

New for 2011, the official textbook list for CMC will be available on Follett's site, [www.coloradomtn.bkstr.com](http://www.coloradomtn.bkstr.com). You also can easily access this site by choosing "bookstore" from the quick links on [www.coloradomtn.edu](http://www.coloradomtn.edu).

Students and other members of the campus community should sign up for the Online Textbook Store's email mailing list here [www.coloradomtn.bkstr.com/email](http://www.coloradomtn.bkstr.com/email) to receive important messages from the CMC Online Textbook Store.

Why did CMC choose Follett Virtual Bookstores?

- \* Follett offers its customers the best text rental program in the industry, which saves 50% or more off the cost of a new book.
- \* The online store also gives CMC students access to the largest supply of money-saving used textbooks, with 2.5 million in stock and ready to ship direct from Follett's warehouse.
- \* Follett offers the best price when buying back books at the end of the term. Students can sell back books anytime online or in-person at Follett's CMC buyback events. Sign up for the online store's email list at [www.coloradomtn.bkstr.com/email](http://www.coloradomtn.bkstr.com/email) for more info on future buyback dates and times.

If you ever have any online bookstore questions, you can email [coloradomtn@fvb.follett.com](mailto:coloradomtn@fvb.follett.com) or call 800-621-4088.

### **VIII. Other Information:**

Two half-day field trips are a component of this course. The field trips will take place in October, exact dates dependent upon weather, and will require moderate level hiking skills, hiking boots, lunch, backpack and water.

#### **Canvas**

Canvas is the online course management system (CMS) used by Colorado Mountain College. You access Canvas via your web browser, i.e.: Mozilla/Firefox, Internet Explorer, Opera, etc. Students, faculty and staff members use the CMC Canvas site to access course announcements, documents, research links and library resources, to receive and deliver completed assignments, take tests, and to communicate with each other via email, discussion boards and chats.

For instructions on How to Access your Canvas Account, Canvas How To's, and who to contact for all your Canvas questions and support needs, please visit:  
[www.coloradomtn.edu/canvas/](http://www.coloradomtn.edu/canvas/).

Students will need access to a computer capable of supporting Canvas throughout the semester. All CMC campuses have computers available for student use.

#### **Student Email**

All CMC students enrolled in a credit-based class (0.5 hour credit class or more) will be assigned a CMC student email address through Google mail (Gmail). Please allow at least 48 hours after you register for this account to be activated. For more information on your CMC student email account, please visit:  
[http://archive.coloradomtn.edu/email/students/student\\_gmail.shtml](http://archive.coloradomtn.edu/email/students/student_gmail.shtml).

#### **A Few Words About Microsoft Word**

Microsoft Word is the standard word processing program for the majority of CMC instructors. Students without Microsoft Word may use the free software from [www.OpenOffice.org](http://www.OpenOffice.org) to create Word-compatible documents. The program also includes spreadsheet, presentation, drawing, and database applications. The program is available for Windows, Macintosh, or Linux operating systems. Microsoft Word is installed on



computers available in computer labs at CMC locations.

### **Saving An Office 2007 File as an Office 2003 File**

Some students have purchased new computers that have Microsoft Office 2007 applications such as Word, Excel and PowerPoint installed. By default, the new version of Office saves files with a .docx extension. This may create compatibility issues with someone using a previous version of Office. For this course, it is suggested that you save your Word files with a .doc extension. This is a simple process. When saving a file created in Office 2007, use the "Save As" feature rather than the "Save" feature. Choose Word 97-2003 format. Your document is saved as a .doc file rather than a .docx file and can be opened and read by older versions of Microsoft Word. You may use the same process when saving an Excel spreadsheet or PowerPoint presentation to insure compatibility with those viewing your file. For more information, including how to make the Word 97-2003 format your default, see [http://archive.coloradomtn.edu/blackboard/training/office\\_2007/office\\_2007.shtml](http://archive.coloradomtn.edu/blackboard/training/office_2007/office_2007.shtml).

### **Virtual Library Information**

You will find online articles, books and other library resources on the following web site: <http://coloradomtn.edu/library>. Our entire collection of online materials is available to you from home.

If you are enrolled in a course that uses Blackboard course management system, you can link to the Virtual Library using Blackboard course menu. If you link to the Virtual Library web site outside of Blackboard, you will be asked to login with either your Blackboard username and password or your CMC Library Card number and a password. To request a library card, fill out the "Library Card Request Form" at [http://coloradomtn.edu/current\\_students/library/databases/card](http://coloradomtn.edu/current_students/library/databases/card). When presented with a login screen enter your 13 digit library card barcode number and the following password: **cmcstudent**.

### **Virtual Library Help Desk**

If you need help with the Virtual Library, email [reference@coloradomtn.edu](mailto:reference@coloradomtn.edu) or call us at 800-621-8559, extension 2629 or 2926. For additional contact information, please access our "Ask a Librarian" service at [http://coloradomtn.edu/current\\_students/library/help](http://coloradomtn.edu/current_students/library/help).

### **Colorado Mountain College Online Learning**

Information is available at: [http://www.coloradomtn.edu/online\\_learning/](http://www.coloradomtn.edu/online_learning/).

