Igneous and Metamorphic Petrology GEOL 3414  
Department of Physical & Environmental Sciences  
Spring 2017

A. COURSE INFORMATION
    Course number/section:  GEOL 3414.001
    Class meeting time:    Monday and Wednesday 02:00 – 03:15
    Class location:        CS – 226
    Labs:                 Monday 03:30 – 05:20, CS – 226
                           Wednesday 03:30 – 05:20, CS – 226
    Course Website:       bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
    Instructor:           Dr. Valeriu Murgulet
    Office location:      CS 205
    Office hours:         M 10:00 am – 12:00 pm; Wednesday 09:00 am – 12:00 pm or by appointment
    Telephone:            (361) 825-6023
    e-mail:               valeriu.murgulet@tamucc.edu
    Appointments:         Please email instructor directly for an appointment, or if you have any questions or concerns.

C. COURSE DESCRIPTION
    Catalog Course Description
    Genesis and occurrence of igneous and metamorphic rocks. Mineralogical composition and thermodynamics of geologic systems. Determination of rock types in hand specimens and thin sections.

D. PREREQUISITES AND COREQUISITES
    Prerequisites
    Mineralogy (GEOL 3411), SMTE-0094 Geology Lab Safety Seminar
    Corequisites
    none

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
    Required Textbook
    Other References
    Winter’s Petrology course website:
    http://www.whitman.edu/geology/winter/
Supplies
A bound notebook
Mechanical pencil, lead size of 0.5 mm or finer
Metric ruler (cm/mm markings)
Protractor or a ruler/protractor

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
By the end of this course, you should be able to:
1. classify igneous rocks in hand specimens and thin-section, and by using geochemical discrimination diagrams,
2. classify metamorphic rocks based on grade and protolith, both in specimens and thin section,
3. determine histories of igneous and metamorphic rocks based on textures,
4. use phase diagrams to infer stable igneous and metamorphic mineral assemblages under various pressure and temperature conditions,
5. discuss the origin, evolution and diversification of magmas, including the role of equilibrium and disequilibrium crystallization and
6. discuss methods of determining pressure and temperature conditions for metamorphic rocks.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
The class will meet on Tuesdays and Thursdays throughout the semester in the classroom to cover the igneous and metamorphic petrology topics. Lecture power point slides, class exercises, discussions will be used while in the classroom. Class lectures prepare you for the lab assignments and for working the field trip assignments. In addition, you are expected to read relevant textbook chapters as announced in class in preparation for lecture and lab assignments. Thus, laboratory exercises will complement the material presented during the lectures.

H. MAJOR COURSE REQUIREMENTS AND GRADING
The following assessment tools will be used:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Chapter Quizzes (Lecture)</td>
<td>15</td>
</tr>
<tr>
<td>Midterm Exam (Lecture)</td>
<td>20</td>
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<tr>
<td>Final Exam (Lecture)</td>
<td>20</td>
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<tr>
<td>Problem Sets (Lecture)</td>
<td>20</td>
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<tr>
<td>Lab Assignments</td>
<td>15</td>
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<tr>
<td>Midterm and Final Exams (Lab)</td>
<td>10</td>
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I. **COURSE CONTENT/SCHEDULE**

<table>
<thead>
<tr>
<th>WEEK OF</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>01/18</td>
<td>Introduction to Igneous Petrology</td>
<td>Chapter 1</td>
<td>Problem Set</td>
</tr>
<tr>
<td>01/23</td>
<td>An Introduction to Igneous Phase Diagrams</td>
<td>Chapter 2</td>
<td>Problem Set</td>
</tr>
<tr>
<td>01/30</td>
<td>Introduction to Silicate Melts and magmas</td>
<td>Chapter 3</td>
<td>Problem Set</td>
</tr>
<tr>
<td>02/06</td>
<td>The Chemistry of Igneous Rocks</td>
<td>Chapter 5</td>
<td>Problem Set</td>
</tr>
<tr>
<td>02/13</td>
<td>Basalts and Mantle Structure, Ocean Magmatism</td>
<td>Chapters 5, 6</td>
<td>Problem Set</td>
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<tr>
<td>02/20</td>
<td>Convergent Margin Magmatism</td>
<td>Chapter 7</td>
<td>Problem Set</td>
</tr>
<tr>
<td>02/27</td>
<td>Intracontinental Plutonism</td>
<td>Chapter 9</td>
<td>Problem Set</td>
</tr>
<tr>
<td>03/06</td>
<td>Interpretation of Granitic Rocks</td>
<td>Chapters 9, 10</td>
<td>Problem Set</td>
</tr>
<tr>
<td>03/13</td>
<td>Spring Break – No classes</td>
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<tr>
<td>03/20</td>
<td>Introduction to Metamorphic Petrology</td>
<td>Chapter 11</td>
<td>Problem Set</td>
</tr>
<tr>
<td>03/27</td>
<td>Interpretation of Metamorphic Phase Diagrams</td>
<td>Chapter 12</td>
<td>Problem Set</td>
</tr>
<tr>
<td>04/03</td>
<td>Metamorphic Facies and the Metamorphism of Mafic Rocks</td>
<td>Chapter 13</td>
<td>Problem Set</td>
</tr>
<tr>
<td>04/10</td>
<td>Thermobarometry and the Conditions of Metamorphism</td>
<td>Chapter 14</td>
<td>Problem Set</td>
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<tr>
<td>04/17</td>
<td>Metamorphism of Peridotitic Rocks</td>
<td>Chapter 15</td>
<td>Problem Set</td>
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<tr>
<td>04/24</td>
<td>Metamorphism of Calcareous Rocks</td>
<td>Chapter 17</td>
<td>Problem Set</td>
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<tr>
<td>05/01</td>
<td>Regional Occurrence and Tectonic Significance of Metamorphic Rocks</td>
<td>Chapter 18</td>
<td>Problem Set</td>
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<tr>
<td>05/10</td>
<td><strong>Final Exam</strong> (comprehensive): 01:45 am – 04:15 pm</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

**Attendance/Tardiness**

Lecture attendance is not required but it is strongly advised. Poor attendance will result in missed lecture material and may reflect in less than desired class performance and/or
unsuccessful class completion. **Lab attendance is mandatory.** Unexcused absences result in a zero. Lab assignments are due after one week, 10% grade deduction/day is enforced for assignments that are not turned in time.

**Late Work**

There is no provision for making up late and/or missed (lab) work. It is also your responsibility to obtain notes and announcements from fellow students in the event you miss a class. Lab assignments and problem sets that are turned in late will receive a 10% grade deduction and are not accepted after they are three days late.

**Extra Credit**

None

**Cell Phone Use**

Not allowed in the class.

**Food in Class**

Not allowed in the class.

**Missed Exams/Quizzes**

Exams can only be taken during the scheduled time, except in cases of emergencies. Documented proof is required of such emergencies. There will be no make up exams or quizzes for unscheduled and unexcused absence. Make-up exams cannot be taken after the graded test has been given back to the class.

**Participation**

Group discussion and collaboration are encouraged during lab exercises.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit
from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, April 8, 2016. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation **WILL NOT** automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that **must** submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

• **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.
• Disability Services
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

• Statement of Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION
• Academic Advising
The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.