GEOS 320 PETROLOGY
Spring, 2018

Instructor: Prof. Jim Mills
E-mail: jmills@depauw.edu
Office: JSC 214
Phone: 658-4669 or 658-4654
Office Hours: 10:30-11:30 MWF or by appointment

Required Text: *Principles of Igneous and Metamorphic Petrology, 2nd ed.*
Winter, J.D., 2010, Pearson/Prentice Hall Publishers,
ISBN 978-0-32-159257-6

Recommended Text: *Petrography of Igneous and Metamorphic Rocks*, 2003, Philpotts, A., Waveland Press Inc., ISBN 1577662954, 192 p.

Class Times: **Lecture**, JSC 226, 9:10 – 10:10 am MWF: **Lab**, JSC 226, 12:40-3:30 pm Tuesday

Attendance: Regular attendance is required for all lectures and labs.

Laboratory: Labs will be assigned on a weekly basis and will be due at the beginning of the following lab period. Late labs will be downgraded 20% for every day they are late. *Failure to turn in three or more labs will result in an 'F' in the course regardless of your performance on exams, homework, and projects.*

Laboratory Equipment: Please bring to lab the following materials: Coloring pencils, an inexpensive compass for drawing circles, hand lens (10x), and calculator.

Homework, Quizzes: There will be several homework assignments over the course of the semester. Late homework will not be accepted. Over the semester, I will give several quizzes that may relate to the reading, lecture material, or other topics I specify (e.g., Geologic Time Scale).

Writing in the Discipline Credit: For Juniors and Seniors taking this course, you will receive credit for the 'Writing in the Discipline' requirement. See the next page for more details.

Field Trip: The class will take a three-day trip to examine the Precambrian geology of Missouri. You are strongly encouraged to participate on this trip as this will be a foundation for the Writing in the Discipline component of this course.

Grade Scale: Grades will be determined based on the following criteria:

Exams (3)	45%	A 100-93%	B- 82-80%	D+ 69-67%
Final Exam	20%	A- 92-90%	C+ 79-77%	D 66-63%
Labs	20%	B+ 89-87%	C 76-73%	D- 62-60%
Homework, Projects, Quizzes	15%	B 86-83%	C- 72-70%	F <60%

WD-Certification: To satisfy the 'WD' requirement for this course, you must achieve a minimum 70% average on all writing assignments and have a cumulative grade in the course of at least a C-. W-courses are designed to enhance your abilities in *1) the logical development of argument, clear and precise diction, and a coherent prose style, 2) the development of general skills of expository writing as they apply in academic disciplines and 3) the reasonable, appropriate, and effective use of special or technical language*.

WD-Assignments: Over the course of the semester you will have several short writing assignments that will focus on formatting a scientific paper, abstract writing, scientific prose, and reference styles. In addition, you will write a formal paper on data you collect in the St. Francois Mountains this spring. In all, you will be writing a minimum of sixteen pages over the course of the semester.

WD-Schedule (This is tentative based on the timing of the fieldtrip)

Week		Paper Topic
Jan.	29	Hand sample descriptions
Feb.	5	Scientific Paper Formats – A review of the literature
	12	Reading a scientific article – summarization
	19	The abstract – a concise overview
	26	Introduction, Data, Results, Discussion, Conclusion of a paper
March	5	Reference Formatting
	12	Field Paper – Introduction draft due
	19	Field Paper – Outline due and reference list due
	26	**Spring Break**
April	2	Field Paper – Meet to discuss paper progress
	9	Field Paper - Draft One due, Friday, April 13th, 4 p.m.
	16	Field Paper – Figure drafts due, Friday, April 20th, 4 p.m.

23 Field Paper – work on final copy (ten page minimum)

30 *Field paper due* – Friday, May 4th, 4 p.m.

Academic Integrity: Any act that places a student in unfair advantage with respect to the rest of the class will be treated according to the University procedures outlined in the Student Handbook.

Americans with Disabilities Act and Amendments (ADAAA) Policy

It is the policy and practice of DePauw University to provide reasonable accommodations for students with properly documented disabilities. Written notification from Student Disability Services is required. If you are eligible to receive an accommodation and would like to request it for this course, please contact Student Disability Services. Allow one week advance notice to ensure enough time for reasonable accommodations to be made. Otherwise, it is not guaranteed that the accommodation can be provided on a timely basis. Accommodations are not retroactive. Students who have questions about Student Disability Services or who have, or think they may have, a disability (psychiatric, attentional, learning, vision, hearing, physical, medical, etc.) are invited to contact Student Disability Services for a confidential discussion in Union Building Suite 200 or by phone at 658-6267.

Meggan Herrald Johnston
Director of Student Disability Services

DePauw University
Student Academic Life
Union Building Suite 200
P: 765-658-6267
F: 765-658-4021 (confidential)

WEEKLY LECTURE SYLLABUS

Date		Topic	Readings
Jan.	29	Introduction to Petrology, Syllabus Review The Earth – An Overview; Igneous Structures	W 1, 4
Feb.	5	Phase Diagrams – One and Two Component Phase Diagrams – Multi-component	W 5, 6, 7
	12	Chemical Petrology	W 8, 9
	19	Basalts, Diversification of Magmas	W 10, 11
		Friday, February 23 EXAM #1	
	26	Diversification of Magmas, Layered Ultramafic Intrusions	W 11, 12
March	5	Mid-Ocean Ridges, Oceanic Intraplate Volcanism	W 13, 14
	12	Ocean Intraplate Volcanism, Flood Basalts	W 14, 15
	19	Flood Basalts, Island Arcs	W 15, 16
		Friday, March 23 EXAM #2	
		SPRING BREAK March 24 – April 1	
April	2	Continental Arcs, Granitoids	W 17, 18
	9	Granitoids, Metamorphism	W 18, 21
	16	Stable Mineral Assemblages, Metamorphic Facies	W 24, 25
	23	Metamorphic Facies – Mafic Metamorphic Reactions/Thermodynamics	W 25, 26, 27
		Friday, April 27 EXAM #3	
	30	Metamorphic Facies - Pelitic Rocks Metamorphic Facies – Calcareous/Ultramafic Rocks	W 28, 29
May	7	Metamorphic Fluids	W 30

Last Day of Classes: Thursday, May 10th

Final Exam: *May 12th, Saturday, 8:30 - 11:30 am*

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WEEKLY LABORATORY SYLLABUS*

Date		*Topic*
January	30	Igneous Minerals and Textures in Thin Section
February	6	Modal Analysis
	13	No lab – Dr. Donna Jurdy visit
	20	Mafic Volcanic/Plutonic Rocks
	27	An Introduction to Petrogenetic Modeling
March	6	Intermediate Volcanic and Plutonic Rocks
	13	Project
	20	Felsic Volcanic and Plutonic Rocks
	27	SPRING BREAK
April	3	Miscellaneous Igneous Rocks
	10	Metamorphic Minerals and Textures
	17	Regional Metamorphism - The Littleton Suite
	24	Contact Metamorphism
May	1	High Pressure, Low Temperature Metamorphism
	8	Lab Practical

*Lab Topics may change – you will be notified as necessary.

Prof. Jim Mills

Dept. of Geosciences

Spring, 2018

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Mary (Maggie) Donohue, Secretary, x4654

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
8-9:00					
9-10:00	**Geos 320** 9:10-10:10		**Geos 320** 9:10-10:10		**Geos 320** 9:10-10:10
10-11:00	**Office Hour** 10:30-11:30		**Office Hour** 10:30-11:30		**Office Hour** 10:30-11:30
11-12:00					
12-1:00					
1-2:00	**Geos 105** 1:40-2:40	Geos 320 Lab 12:40-3:30	**Geos 105** 1:40-2:40		**Geos 105** 1:40-2:40
2-3:00					
3-4:00					
4-5:00	Dept./Faculty Meeting				
5-6:00					
6-7:00					
7-8:00		Geos 300 7:00-8:30			
8-9:00					

Geos 105 Earthquakes and Volcanoes – Julian 223
Geos 300 Writing in the Geosciences – Julian 223
Geos 320 Petrology – Julian 226

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DAILY SYLLABUS

Date		Topic
Jan.	29	Introduction to Petrology, Syllabus Review
	31	Igneous Structures
Feb.	2	Igneous Structures, Phase Diagrams: One Component
1		
	5	Phase Diagrams: Two Component
	7	Phase Diagrams: Two Component, Multicomponent
	9	Phase Diagrams: Multicomponent
2		
	12	No class – Dr. Donna Jurdy visit
	14	Chemical Petrology
	16	Chemical Petrology
3		
	19	Basalts
	21	Basalts, Diversification of Magma
	23	**EXAM #1**
4		
	26	Diversification of Magma
	28	Layered Ultramafic Intrusions
Mar.	2	Layered Ultramafic Intrusions
5		
	5	Mid-Ocean Ridges
	7	Mid-Ocean Ridges
	9	Oceanic Intraplate Volcanism
6		
	12	Oceanic Intraplate Volcanism

	14	Oceanic Intraplate Volcanism
	16	Island Arcs
7		
	19	Island Arcs
	21	Island Arcs
	23	**EXAM #2**
8		

SPRING BREAK March 24 – April 1

April	2	Continental Arcs
	4	Continental Arcs
	6	Granitoids
9		

DAILY SYLLABUS

Date		Topic
April	9	Granitoids
	11	Metamorphism
	13	Metamorphism
10		
	16	Stable Mineral Assemblages
	18	Stable Mineral Assemblages, Metamorphic Facies - Mafic
	20	**EXAM #2**
11		
	23	Metamorphic Facies - Mafic
	25	Metamorphic Reactions
	27	Metamorphic Reactions - Thermodynamics
12		30
	Metamorphic Facies - Pelitic Rocks	
May	2	Metamorphic Facies - Pelitic Rocks
	4	Metamorphic Facies - Calcareous and Ultramafic Rocks
13		
	7	Metamorphic Fluids
	9	Open
14		

Last Day of Class – Thursday, May 10th

FINAL EXAM Saturday, May 12, 8:30 – 11:30 am