

I. COURSE DESCRIPTION:

Students will gain an understanding of the processes that have led to the incredible variety of soils, rocks, mineral and geological formations in the Algoma region. These will be related to local history, ecology and land use and the economy. The course will emphasize the origin and identification of rocks and minerals and geological formations including glacial features. This course is designed for non-geology students who have an interest in the natural history aspect of geology. Emphasis will be placed on the interpretation of geology for educational and ecotourism purposes.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain the Geological Development of the Earth since the beginning of its formation and identify minerals and rocks

Potential Elements of the Performance:

- Describe the makeup of the earth
- The rock cycle
- Major types of rocks and difference between them
- Explain the theory of plate tectonics, (continental drift)
- Explain why magnetic reversals are observed
- Explain the structure of subduction zones and their associated phenomena
- Describe mid-oceanic ridges
- Describe the geological time scale and how it applies to Ontario
- Explain the development of the present-day continents.
- Explain the major dating processes used to determine the age of rocks
- Relate geological features to natural landscapes
- Explain the geological history of the Great Lakes
- Identify a variety of rock types found in the Algoma District and relate them to the previously described geological processes
- Identify a variety of important and common minerals of Ontario

This learning outcome will constitute 35% of the course's grade.

2. Explain the Development of Ontario's Precambrian Shield Country.

Potential Elements of the Performance:

- Explain the role of Plate Tectonics in forming the Precambrian in Ontario
 - the Archean Continent and Superior Province
 - the Southern Province-a Zone of Transition and Change
 - the Grenville Orogeny and the Grenville Province
 - Pre-Cambrian Sedimentation, glaciation and Metamorphosis

- Describe the present-day Precambrian provinces and zones in relation to the building processes described previously
This learning outcome will constitute 20% of the course's grade.

3. Describe the Sedimentary building events of the Paleozoic era, which have led to Sedimentary rock formation south and north of the Precambrian Shield.

Potential Elements of the Performance:

- Describe the main types of sedimentary rock found in Ontario in relation to rock type, origin, characteristics and age
- Explain the formation of Precambrian sandstones
- Identify the major sedimentary rock types
- Identify major fossil groups found in the sedimentary rocks of Ontario
- Relate each of the above to Ontario's geological time scale

This learning outcome will constitute 15% of the course's grade.

4. Explain the major glacial events in Ontario's recent history and describe the resulting impacts on Surficial Geology and Landforms .Explain the development of soil horizons and link soil characteristics to bedrock and surficial geology.

Potential Elements of the Performance:

- On maps of Ontario, describe the sequences of glacial advances and associated glacial lakes
- Explain Isostatic rebound and how this phenomenon has left its mark in Algoma District
- Identify and explain the formation of glacial landforms such as eskers, drumlins, kames, potholes, outwash plains and moraines
- Explain climate change in the recent epoch and its impact on animal and plant populations
- Explain the relationship between the lithosphere and soil

- Describe a typical soil horizon sequence from the Algoma region
- Explain relationships between glacial landforms, soils and plant and animal communities

This learning outcome will constitute 30% of the course's grade.

III. TOPICS:

1. Geological Development of the Earth –
 - Layers composing the earth
 - Plate tectonics
 - Magnetic reversals
 - Subduction zones and associated structures
 - mid-oceanic ridges
 - geological time scale in Ontario
 - development of present -day continents
 - methods used to date rocks and organic matter
 - origin of rocks and mineral
 - rock and mineral identification
 - geological history of the great Lakes Region
2. Development of the Precambrian Shield-
 - the Archean Continent
 - superior Province
 - southern province
 - Grenville province
 - the building stages that occurred to form the Precambrian shield
 - Rocks and minerals and geological features associated with the Canadian shield
3. Sedimentary rock formations and types
 - Origin of sedimentary rock and associated rock formations
 - main types of sedimentary rocks and their characteristics in Ont.
 - Identification of sedimentary rock and associated fossils
 - Geological time scale and rock formations in southern Ontario
 - Fossil identification
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4. Glacial history and resulting surficial Geology, soils and ecology
 - Sequences of glacial advances
 - Glacial lakes and isostatic rebound
 - Morainal deposits
 - Glacial - fluvial landforms
 - Glacial-lacustrine landforms
 - Soil formation
 - Soil horizonation and soil classification
 - Soil –bedrock relationships

- Soils, geology and ecology
- Landform identification in the field
- Landform identification using aerial photography

IV Required Resources/Texts/Material:

Eyles, N. 2002. Ontario Rocks, three Billion Years of Environmental Change. Fitzhenry & Whiteside, Markham (ON).339 pages.

Some Other Resources Available on Reserve in the Library:

American Geological Institute. 1984. Dictionary of Geological Terms. Toronto, Anchor Books, Doubleday 571 pp.

Annelis, R.N. 1973. Proterozoic Flood Basalts of Eastern Lake Superior: The Keweenaw Volcanic Rocks of the Mamainse Point Area, Ontario. Geol. Survey Can., Pap. 72-10. 51 pp, map, figure.

Chernicoff, S., H.A. Fox and R. Venkarakrishnan. 1997. Essentials of Geology. New York, Worth Publ. 411 pp. Appendices.

Geddes, R.S., F.J. Kristjansson and J.T. Taylor. 1987. XII th Inqua Congress Field Excursion c-12. Quaternary Features and Scenery along the North Shore of Lake Superior.62 pp.

Hewitt, D.F., and E.B. Freeman. 1978. Rocks and Minerals of Ontario, Revised Edition. Ontario Department of Mines and Northern Affairs, GC 13, 145 pp.

Karrow, P.F. 1991. Quaternary Geology, St. Joseph Island. Ont. Geol. Surv., Open File Rep. 5809. 81 pp. maps.

Levin, H.L. 1988. The Earth Through Time. Philadelphia, Saunders College Publishing. 595 pp plus Appendices, Index.

Levin, H.L. 1990. Contemporary Physical Geology. Toronto, Saunders. 623 pp.

Lutgens, F.K. and E.J. Tarbuck. 2000. Essentials of Geology. Upper Saddle River (NJ), Prentice Hall.449 pp.

Merritts, D., A. De Wet and K. Menking. 1998. Environmental Geology. New York, W.H. Freeman. 452 pp.

Ministry of Northern Development and Mines, Ontario 1994. ROCK Ontario. ROCK ON Series 1, Queen's Printer for Ontario, Toronto 89 pp.

Mottana, A. et al. 1977. Simon & Schuster's Guide to Rocks and Minerals. New York, Fireside Books, Simon & Schuster 607 pp.

National Geographic Society. 1976. Our Continent, a Natural History of North America. Washington, National Geographic Society. 398 pp.

Ontario Institute of Pedology. 1985. Field Manual for Describing Soils, 3rd Edition. Ontario Institute of Pedology, University of Guelph, Guelph ON. 42 pp.

Pellant, Chris . 1992. Rocks and Minerals . Eyewitness Handbook. Dorling Kindersley, London 256 pp.

Press, F. and R. Siever. 2000. Understanding Earth. NY. W.H. Freeman. 573 pp.

Pye. E.G. 1997. Roadside Geology of Ontario: North Shore of Lake Superior. Ontario GEOservices Centre, ROCK ON Series 2, 164 pp.

Robertson, J.A. and K.D. Card. 1972. Geology and Scenery, North Shore of Lake Huron Region. Ont. Geol. Survey, Geol. Guide Book 4. 224 p.

Russell, L.S. 1965. The Mastodon. Royal Ontario Museum, Toronto. 16 pp.
Shrock, R.R. and W.H. Twenhofel 1953. Principles of Invertebrate Paleontology. New York, McGraw-Hill. 816 pp

Sabina, A. P. 1991. Rocks and Minerals for the Collector; Sudbury to Winnipeg. Geol. Survey Canada Misc. Rep.49:315 pp.

Strickland, D. 1998. Brent Crater Trail, History of the Crater. Whitney (ON), Friends of Algonquin Park. 14 pp.

Symes, R.F. et. al. 1988. Rocks & Minerals. Toronto, Stoddard Publ. 64 pp.

Tarbuck, E.J. and F.K. Lutgens. 2005. Earth, an Introduction to Physical Geology. Upper Saddle River (NJ), Pearson Prentice-Hall. 711 pp.

Theberge, J.B. 1989. Legacy, The Natural History of Ontario. Toronto, McClelland & Stewart Inc. 397 pp. (available in reference section)

Thompson, I. 1997. National Audubon Society Field Guide to North American fossils. New York, Alfred A. Knopf. 846 pp.

Tovell, W.W. 1979. The Niagara River. Toronto, Royal Ontario Museum. 25 pp.

Tovell, W. M. 1992. Guide to the Geology of the Niagara Escarpment, with Field Trips. Niagara Falls (ON), Niagara Parks Commission. 159 pp., Field Trips a-1 to J-8 and Appendices.

Thurston, P.C. et al. (Editors) 1991. Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 1. 711 pp., part 2, 1525 pp.

Verma, H. M. 1979. Geology and Fossils, Craigeith Area, Ontario. Ont. Geol. Survey Guidebook 7, 61 pp.

Waddington, J. 1979. An Introduction to Ontario Fossils. Toronto, Roy. Ont. Mus. 28 pp.

V. EVALUATION PROCESS/GRADING SYSTEM:

The final grade will be determined on the basis of the following:

Term test 1- Unit 1:	20%
Term test 3 – Units 3-4:	25%
Rock and mineral Identification Test:	20%
Presentation on Geological Feature:	10%
Field Trip Reports	15%
Alona Bay	10 %
Soils	5%

Attendance & Participation	<u>10%</u>
Total	100%

. Attendance on field trips is mandatory. Field trips may run an extra hour or more than the scheduled class time All reports will be discounted 10% per day late and after 5 school days late will not be accepted.

Presentations are to be done on the prescribed day or marks will be deducted .

The professor may assign a final course F grade at any time if attendance or behavior is unacceptable. Absence for more than 25% of class time over the enter course is unacceptable.

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:

The College considers **WebCT/LMS** a primary channel of communication for each course. Regularly checking this software platform is critical as it may keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain an Application for Advanced Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning may be given upon successful completion of a challenge exam or portfolio.