GEO 302 Quaternary Geology

Summer 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

The Quaternary period, spanning the past 2 million years, has been marked by significant geological processes, particularly the late Quaternary Ice Ages. This course delves into the major geological phenomena characterizing this period, emphasizing the dating methods crucial for establishing chronologies. It explores the Milankovitch theory of Ice Ages and examines climatic cycles evident in geological archives such as corals reefs, lake sediments, desert dust, cave sediments, and ice cores.

Upon Completion of this Course, students will be able to:

1. Understand the major geological processes of the Quaternary period;
2. Analyze glacial landforms and sedimentary deposits, and interpret their formation processes;
3. Understand the Quaternary timescale and major glaciations in Earth's history;
4. Evaluate short-term and long-term factors contributing to Quaternary climate change;
5. Interpret Quaternary environments using biological evidence and dating methods.

PREREQUISITES

GEO 227 Introduction to Earth Systems

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
4 Labs and Reports	20 Points
2 Quizzes	20 Points
Term Paper and Presentation	20 Points
Midterm Exam	15 Points
Final Exam	25 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Past Glacial Environments, 2nd Edition, edited by John Menzies and Jaap J.M. van der Meer.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Quaternary glaciation and chronology Topic 2: Glacial landforms Topic 3: Periglacial landforms Topic 4: Sea-level change/River terraces **Assessments:** Lab #1 Lab Report #1

Module 2	**Topics:** Topic 5: Glacial sediments/Periglacial sediments Topic 6: Palaeosols Topic 7: Lake-level records from low-latitude regions Topic 8: Ice-core stratigraphy **Assessments:** Lab #2 Lab Report #2 Quiz 1
Module 3	**Topics:** Topic 9: The nature of the Quaternary fossil record Topic 10: The taphonomy of Quaternary fossil assemblages Topic 11: The interpretation of Quaternary fossil assemblages Topic 12: Multi-proxy palaeoecological studies **Assessments:** Lab #3 Lab Report #3 Midterm Exam
Module 4	**Topics:** Topic 13: Dating methods: radiocarbon, potassium-argon, argon-argon Topic 14: Dating methods: Uranium-series, fission track, luminescence, electron spin resonance Topic 15: Dating methods: Cosmogenic radionuclides, dendrochronology, varve chronology, lichen Topic 16: Stratigraphic and temporal resolution **Assessments:** Lab #4 Lab Report #4 Quiz #2
Module 5	**Topics:** Topic 17: Climatic change over Milankovitch timescales Topic 18: Environmental change over sub-orbital (millennial) timescales Topic 19: The Last Termination Topic 20: Climate and the Holocene **Assessments:** Term Paper and Presentation Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to

decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the

academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.