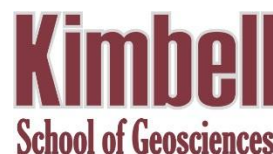


Paleoecology (GEOS 4644)

McCoy College of Science, Mathematics, and Engineering
Fall 2025



General Course Information

- Lecture Meetings: Monday, Wednesday, Friday | 9:00 am – 9:50 am | Bolin Hall 125
- Laboratory Meetings: Tuesdays | 3:00 pm – 4:50 pm | Bolin Hall 125
- Course D2L Site: We will only use the main course site for the lecture section, there will be no content in the laboratory section sites.
 - [Link to the Paleoecology D2L Site](#)

Instructor Information

- Professor
 - Dr. Steven J. Rosscoe | steven.rosscoe@msutexas.edu | 940.397.4448
Office Hours: MWF 10:00 am – 11:00 am | MF 1:00 pm – 2:00 pm | Bolin Hall 101 A
Virtual Office Hours: By Appointment | [Zoom Office Hours Link](#)

Course Description

This course will introduce upper-level and graduate earth and environmental science students to the field of paleoecology, with a focus on marine ecosystems. Lecture will cover a broad range of topics related to paleoecology including the geological and biological foundations of the field, methods of evaluation, and applications. The course will also investigate the related fields of paleobiogeography and paleoclimatology. A course project will allow students to collect, analyze, and evaluate populations as they change with sea-level and over time.

Course Learning Objectives

The successful completion of this course will be evaluated around the following course learning objectives. Each of these course learning objectives include aspects of both content knowledge and skills development. Students will:

1. Review the essential principles of geology, ecology, and paleontology necessary to use paleontological data to interpret and evaluate past environmental, climatic, and depositional conditions.
2. Work with real paleontological data sets to evaluate past depositional systems and environments ecological variation within depositional systems.
3. Collect, process, and assess fossil communities from a geographic location at different depths of sea level and compare the total faunas to evaluate ecological variation with sea level.
4. Use statistical and graphical evaluation methods to assess community and population variation in different depositional environments.

***Graduate students taking the course for graduate credit will:**

5. Learn to apply morphometric principles to the analysis of a diverse population of organisms to quantify variation and evaluate morphological evolution through time.

Instructional Materials

The following materials are required for the successful completion of the course. In designing this course all efforts were made to keep your costs as low as possible. There is no lab manual to purchase and traditional textbooks.

Required Textbooks

There is no textbook required for this course, as there isn't really a good one out there that is specifically focused on paleoecology.

Required Software Applications

- Microsoft Office: Word, PowerPoint [Free Access to Microsoft Office 365](#)
 - Required for completion of laboratory activities.
- PDF Reader
 - PDFs are used to provide some course materials; a browser PDF reader or Adobe Acrobat will be necessary to view them.
- ImageJ
 - Free NIH software for measuring using photomicrographs. [Link to ImageJ Service](#)

Supplemental Readings

Throughout the semester supplemental readings are provided as PDFs in D2L. Many of these documents will be foundational contributions to field of paleoecology. Often these are from publications that pre-date ADA document standards and screen readers. If you require a screen-reader optimized version of the document, please contact the instructor (note: it may take some time to prepare larger documents, so notify the instructor of this need early in the semester).

Grading Information

The formal grade for this course is determined by your performance on lecture exams, a course project, and laboratory activities. ***Graduate students seeking graduate credit must complete the additional morphology project.** Your grade is calculated by dividing the points earned during by the total number of points possible in the semester.

Table 1: Allocation of Points by Assignment Type

The table below shows the total number of points for each major category of assignment that are possible this semester. For more details about the assignments see the section for that assignment in this portion of the syllabus.

Assignments (Quantity)	Undergraduates	Graduates
Lecture Examinations (3)	300	300
Course Project (1)	100	100
Lab Activities (10)	200	200
Graduate Morphology Project (1)	Not Required	100
Total Points	600	700

Table 2: Points, Percentage, and Letter Grade Values

The table on the following page shows the point-value and percentage-value required to reach a particular letter grade in the course. The table reflects the optimal running of the course where there are no missed days or activities. The instructor reserves the right to change the point distributions to reflect such changes. The percentage requirements will remain unchanged throughout the semester. Percentage grades are rounded to the nearest whole percent.

Grade	Undergraduates	Graduates	Percentage
A	540 and up	630 and up	90% and up
B	480 to 539	560 to 629	80% to 89%
C	420 to 479	490 to 559	70% to 79%
D	360 to 419	420 to 489	60% to 69%
F	Less than 360	Less than 420	59% or less

Lecture Examination Information

During the semester there will be three examinations covering our three major units in the course. The units are Ecology and Paleoecology (Weeks 1-5), Paleoenvironments (Weeks 5-10), and Paleogeography and Paleoclimatology (Weeks 11-15). Each examination is worth 100 points. Examinations will be released the day we finish the lecture material for that unit and will be due by their scheduled due date on the course schedule (last page of this syllabus), typically a week or more is provided, except for examination 3 (must be submitted on the final exam date). Examinations are a mix of short answer and essay style questions. Short answer questions are typically worth five to ten points each and require complete grammatically correct sentences. Essays are typically worth twenty points and require multiple paragraphs and a structured response. These examinations will be submitted through D2L as online quizzes.

These examinations are individual assignments; they are not group activities. Examinations are open notes (this includes course notes, the textbook, and peer-reviewed scientific papers). You may not use websites, other humans, or AI to write your answers to these questions. Use of websites, other humans, and/or AI in answering examination questions will result in a grade of zero on the examination.

Course Project Information

The project for the paleoecology course requires full participation in a field trip to Jingo, Kansas where we will study several major cyclothemic successions of rocks (Note: the field trip will be run in conjunction with the graduate Carbonate Depositional Systems course). These successions record the rise and fall of sea level in the midcontinent sea. The paleoecology class will collect samples of the transgressive limestone, core shale, and regressive limestone of the Swope Cyclothem. Students will work in two groups to process and assess the conodont fauna of the units (one group – the limestones, one group – the core shale). Much of the processing work will be completed as part of the lab activities for the course. The culmination of the project will be a written paper (individual assignment) with a brief introduction, description of the conodont fauna found in each rock unit, and a discussion of the relationship between faunal differences,

stratal order and sea level. More details will be provided later in the semester, including a rubric for how the final paper will be graded. This project is worth 100 points.

Laboratory Activities Information

There are ten laboratory activities in the paleoecology course. Each student must complete all ten activities. Each activity is worth 20 points for the overall course grade. Each lab must be completed and submitted in D2L by 11:59 pm on the Monday following the lab activity. The first few labs are focused on developing simple skills necessary in the field of paleoecology. The remaining laboratory activities are focused on working with different aspects of the course project to keep you moving and help you complete the necessary steps in the course project. The lab assignment and lab submissions are individual endeavors; however, you may work with data collection and discuss methodologies in groups as you complete the overall activity.

Graduate Morphology Project (*Graduate Student Requirement Only)

Graduate students seeking to earn graduate credit in the course are required to complete an additional project that will enhance their understanding of morphology and variation in morphology over geologic time. This semester, graduate students will be provided a photomicrograph set of conodonts belonging to the genus *Gondolella* from three different stratigraphic intervals in north-central Texas. Using the photomicrograph set, the students will measure key morphological features of the elements. Students will generate a series of bivariate plots to show the distribution of different morphologies in morphospace. Students will assess the data to see if distinct species groups are apparent and how the genus morphology changes over time. The photomicrograph set will be released in early September along with the excel spreadsheet for data collection. The graph list will be released by the end of September and the instructions for the paper will be released in early October. This project is worth 100 points.

Extra Credit

The only extra credit opportunities in this course will be given to the entire class, do not ask for individual extra credit. There is one planned extra credit activity (Introduce Yourself Extra Credit (see details in D2L). Additional extra credit assignments may be assigned as the semester progresses at the discretion of the instructor. Extra credit assignments are assignments that have due dates; no late credit will be given.

Late Work Policy

This is an online course where each assignment has a week or more of lead time before their due date. ***No late work will be accepted.** Missed labs and examinations may be made up with a legal, paper-documented, excuse.

Make-Up Work/Tests

For legal, paper-documented excuses make-ups for labs and examinations can be completed. Make-up work should be arranged for in advance wherever possible. The instructor will give you a new deadline that is reasonable for the course timeline. ***No make-up work (lecture or lab) will be allowed beyond 10 days past the original deadline.**

Note: You must complete the assignments, laboratories, and examinations presented in this syllabus. ***No substitute assignments will be allowed to compensate for poor performance or missed deadlines.**

Instructor Classroom Policies

The following policies are the policies that are integral for our successful completion of the course and should be read thoroughly. If you have any questions, please see the instructor.

Academic Honesty Policy

Academic dishonesty is considered cheating, collusion, and plagiarism. Any unauthorized assistance during the completion of assignments, using on aids beyond those authorized for an assignment, or the use of other people or services to complete assignments is considered cheating. Working with others in a way that is not authorized by the instructor to complete assignments is considered to be collusion. Plagiarism is the use of another person's materials (by paraphrase or direct quotation) without giving them full and clear acknowledgement. The use of material prepared by another person or agency selling term papers and academic materials is also considered plagiarism.

The use of any artificial intelligence (AI) in completing course assignments is NOT allowed. AI in this sense is any technology that summarizes, writes, or answers questions on its own. Recent court rulings have allowed lawsuits to go forward against Chat GPT and other AI operators because it directly plagiarizes the use of others. College is about you learning to write, you developing your voice, and you learning how to process, summarize, and properly cite information. Any use of AI is considered a violation of this academic honesty policy.

If a student is caught cheating, colluding, or plagiarizing on any assignment the assignment grade will automatically be a zero. Two or more violations will result in failure of the course.

Classroom Civility Policy

Learning, especially in science, can be a very challenging process. Learning often requires putting yourself out there and being vulnerable. Science also happens to be at the forefront of information which may conflict with personal beliefs. Your beliefs are yours and nothing will change that, though those beliefs may not get you credit on the exam. We are focused on science and what understandings have been developed in the field. Additionally, no scientist thinks the same way as every other scientist. To develop the best understandings of our universe, we must seek input from all people in the field.

In my classroom, we strive to create an environment where everyone is respected and valued for who they are. We are all here together, learning together, and working toward the same goal. This is not a place for hate of any kind. The use of derogatory language, hate speech, or violence is absolutely unacceptable in this classroom and in any setting related to the course. Learn to work with and value all people. Be civil and treat each other with respect. Do your best to listen to each other, in any conversation. Use of derogatory language, hate speech, or violence will result in removal to the classroom or the course.

Dr. Rosscoe is available to help if you have any concerns or questions about building a positive classroom environment. The campus also has numerous resources related to a safe and welcoming experience at MSU. Also, don't forget the MSU Safety App.

- [Title IX Misconduct](#): Dating violence, sexual assault, sexual harassment, stalking, and other forms of sexual misconduct.
- [Bias Incident Reporting](#): Bias and hate incidents related to race, gender, or sexual identity.
- [Disability Grievance Procedures](#): Discrimination on the basis of disability.

COVID-19 and Illnesses Policy

Since COVID-19, classroom health has been a necessary and probably long overdue focus. While there are no longer COVID-19 policies in place by the university the following procedures are scientific best practices. These same principles can be applied to any viral infection (flu, cold, etc.).

- If you become ill and have symptoms, get tested.
- If you are positive for COVID-19, stay home. It's good for your recovery and good for protecting your peers.
- Illness happens and if you absolutely must be in public, wear a mask. Even a cloth mask reduces the chance you will spread the illness to others.
- If you stay home or miss assignments, be sure to get a doctor's note and excuse. It allows the instructor to help you make things up.

In the case of long-term illnesses or medical situations that will prevent you from attending classes regularly, contact the professor as soon as possible. We will work together to make sure that you can succeed, just make sure it is Doctor-documented. I can't do much to help, if I don't know until the day before the semester ends.

Electronic Devices Policy

Use of electronic devices for taking notes is allowed in my classroom. Recording (audio or video) is not allowed unless approved by the instructor for educational purposes. The use of social media or streaming anything is not an appropriate use of technology during class. If your use of technology is non-educational or is being disruptive to your peers, you will be asked to leave. If you're in the back of the room, ear buds in, and smiling as you watch something on your device, I do notice. Don't be that person.

Course Grades and Grade Bumps Policy

In my courses, a grade is earned by accumulating points throughout the semester. The grade you earn in the course is determined by the number of points you earn through the timely completion of assignments. As such, at the end of the semester, there are no grade bumps given out. Do not ask how or if you can be bumped up to the next letter grade, if you haven't earned the points, you will not be able to get that grade.

If you believe there to be an error in the calculation of your grade, whether it is on a specific assignment or the whole course feel free to ask me to re-evaluate and double check. I will do so happily. For specific assignments, be prepared to give me specific reasons you feel the grade is wrong (which wrong answer do you think was right, etc.).

Desire-to-Learn (D2L)

Extensive use of the MSU D2L learning management system is required in this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into D2L through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Computer Requirements

Taking this course involves the completion of all lecture exams, reading quizzes, and discussions in the course learning management system (D2L). This class requires you to have access to a computer (with Internet access) to complete and upload your assignments. It is your responsibility to have (or have access to) a working computer in this class. ***Assignments and tests are due by the due date, and personal computer technical difficulties will not be considered a reason for the instructor to allow students extra time to submit assignments, tests, or discussion postings.** Computers are available on campus in various areas of the buildings as well as the Academic Success Center. ***Your computer being down is not an excuse for missing a deadline!!** There are many places to access your class! Our online classes can be accessed from any computer in the world which is connected to the internet. Contact your instructor immediately upon having computer trouble. If you have technical difficulties in the course, there is also a student helpdesk available to you. The college cannot work directly on student computers due to both liability and resource limitations however they are able to help you get connected to our online services. For help, log into D2L.

Inclement Weather Policy

In cases of extreme weather events that delay or close campus and where those delays or closures impact the course:

- If the closure or delay includes lecture meeting time, the lecture will not meet and the lecture schedule for the semester will be modified.
- If the closure or delay includes a laboratory meeting time, the laboratory will not meet and all remaining laboratory meetings for the week will be cancelled to keep the lab sections on the same schedule. Lab due dates and lab quiz dates will be adjusted.
- If due dates are impacted by the delay or closure, they will be rescheduled.
- All changes to the course schedule will be posted, in writing, in D2L.

NOTE: Because all students do not have equal or reliable access to technology and internet, especially in times of inclement weather, we WILL NOT shift to online in cases of inclement weather.

University Policies and Information

The following information and policies apply to this course. Please read each of these policies and ask your instructor if you have any questions.

Important Dates

- First Day of Classes: August 25th, 2025
- Change of Schedule and Late Registration: August 25th-28th, 2025
- Labor Day University Holiday: September 1st, 2025
- Last Day to File for December Graduation: October 6th, 2025
- Priority Deadline to File for May Graduation: October 8th, 2025
- Last Day for “W” (Drops after this date receive “F”: November 24th, 2025
- Thanksgiving Holiday: November 26th to 28th, 2025
- Last Day of Classes: December 5th, 2025
- Final Examinations: December 6th to 11th, 2025
- Graduate Commencement: December 12th, 2025
- Undergraduate Commencement: December 13th, 2025

Attendance

Students are expected to attend all meetings of the classes in which they are enrolled. Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students of the specifics in writing at the beginning of the semester in a syllabus or separate attendance policy statement. An instructor who has an attendance policy must keep records on a daily basis. The instructor must give the student a verbal or written warning prior to being dropped from the class. Instructor's records will stand as evidence of absences. A student with excessive absences may be dropped from a course by the instructor. Any individual faculty member or college has the authority to establish an attendance policy, providing the policy is in accordance with the General University Policies.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state)

exist in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to [Disability Support Services](#).

Campus Carry Rules/Policies

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit [Campus Carry Rules and Policies](#).

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit [Safety / Emergency Procedures](#).

Smoking and Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building owned or operated by MSU. Adult students may smoke only in the outside designated-smoking areas at each location

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Grade Appeal Process

Following the appropriate procedure for grade appeals requires you to speak to your instructor first, so talk to your instructor. Students who wish to appeal a grade should consult the Midwestern State University [Undergraduate Catalog](#).

Lecture Topic Schedule

The following is the schedule for the lecture topics we will study during the semester. This schedule will vary over the semester as some topics may move quicker or slower than expected. At the end of each unit, if there is time, we will hold an impromptu review session. ***Note: Changes in the course syllabus, procedures, assignments, and schedule may be made at the discretion of the instructor.**

Week	Dates	Monday Topic	Wednesday Topic	Friday Topic
1	Aug 25 to Aug 29	Introduction	Principles of Ecology	Populations
2	Sep 01 to Sep 05	No Class <i>Labor Day Holiday</i>	Communities	Communities
3	Sep 08 to Sep 12	Gathering Paleo Data	Ecosystems	Abiotic Components
4	Sep 15 to Sep 19	Abiotic Components	Biotic Components - Growth	Biotic Components – Growth Rates
5	Sep 22 to Sep 26	Population Statistics	Comparison of Means	Correlation
6	Sep 29 to Oct 03	Paleoenvironment	Terrestrial Systems	Transitional Systems
7	Oct 06 to Oct 10	Marin Systems	Controls - Climate	Controls - Geography
8	Oct 13 to Oct 17	Lithological Clues	Magical Interpretation Chart – Part I	Magical Interpretation Chart – Part II
9	Oct 20 to Oct 24	Modes of Life	Adaptation	Modern Distributions of Life
10	Oct 27 to Oct 31	Ancient Distributions of Life	Magical Interpretation Chart – Part III	Magical Interpretation Chart – Part IV
11	Nov 03 to Nov 07	Paleogeography	Provinces & Barriers	Provincial Species
12	Nov 10 to Nov 14	Cosmopolitan Species	Tectonism	Fossils & Tectonics
13	Nov 17 to Nov 21	Paleoclimatology	Lithostratigraphy & Facies	Chemostratigraphy
14	Nov 24 to Nov 28	Stable Isotopes	No Class <i>Thanksgiving Holiday</i>	No Class <i>Thanksgiving Holiday</i>
15	Dec 01 to Dec 05	Fossils & Geochemistry	Oxygen & Carbon Isotopes	Other Isotopes

Additional Information

- If we do not finish the content for unit within the class time, the remaining lecture content will be released as video lectures in D2L.
- I will be attending a conference October 18-22, 2025. Lectures will be video lectures on D2L.
- The final exam block is Monday, December 8, 2025, from 8:00 am to 10:00 am. The exam is online, in person attendance is not required. I will be available in my office at that time.
- The tentative dates for the class field trip, in conjunction with the graduate carbonates class, is October 3rd – October 5th, 2025. This trip will be a full day on a massive outcropping of Pennsylvanian rocks in eastern Kansas.

Laboratory Activity Schedule

The following is a table of all laboratory activities required for the successful completion of this course. All laboratory activities are due by 11:59 pm on the Monday following the lab meeting.

***NOTE: Changes in the course syllabus, procedures, assignments, and schedule may be made at the discretion of the instructor.**

Week	Dates	Lab Activity
1	Aug 26	No Lab Meetings - <i>First Week of Classes</i>
2	Sep 02	Lab 1 – Biodiversity
3	Sep 09	Lab 2 – Gathering Paleontological Data
4	Sep 16	Lab 3 – Growth Curves
5	Sep 23	Lab 4 – Population Statistics
6	Sep 30	Lab 5 – Cyclothem and Sea Level Change (Project-Based)
7	Oct 07	Lab 6 – Recovery Methods (Project-Based)
8	Oct 14	Lab 7 – Species Recognition (Project-Based)
9	Oct 21	No Lab Meeting - <i>Dr. Rosscoe Away at GSA Meeting</i>
10	Oct 28	Lab 8 – Abundance Data (Project-Based)
11	Nov 04	Lab 9 – Figure Preparation (Project-Based)
12	Nov 11	Lab 10 – Paper Outlining (Project-Based)
13	Nov 18	Project Period
14	Nov 25	Project Period
15	Dec 02	Project Period

Course Due Dates in Chronological Order

The following table lists the due dates of each assignment in the course. All items are due at 11:59 pm on the date for which they are due. ***NOTE: Changes in the course syllabus, procedures, assignments, and schedule may be made at the discretion of the instructor.**

Due Date	Assignment
Monday, September 8 th , 2025	Lab 1 – Biodiversity
Monday, September 15 th , 2025	Lab 2 – Gathering Paleontological Data
Monday, September 22 nd , 2025	Lab 3 – Growth Curves
Monday, September 29 th , 2025	Lab 4 – Population Statistics
Friday, October 3 rd , 2025	Examination 1: Paleoecology
Monday, October 06 th , 2025	Lab 5 – Cyclothem and Sea-Level Change (Project-Based)
Monday, October 13 th , 2025	Lab 6 – Recovery Methods (Project-Based)
Monday, October 27 th , 2025	Lab 7 – Species Recognition (Project-Based)
Monday, November 03 rd , 2025	Lab 8 – Abundance Data (Project-Based)
Friday, November 07 th , 2025	Examination 2: Paleoenvironments
Monday, November 10 th , 2025	Lab 9 – Figure Preparation (Project-Based)
Monday, November 17 th , 2025	Lab 10 – Paper Outlining (Project-Based)
Tuesday, November 25 th , 2025	Graduate Morphology Project
Friday, December 05 th , 2025	Course Project
Monday, December 8 th , 2025	Examination 3: Paleogeography and Paleoclimatology

Official End Date of the Course

The last day of this course is Monday, December 8th, 2025. Following that date grades will be calculated and reported. Any work that is not submitted by 11:59 pm on December 8th, 2025 will receive a grade of zero. No work will be accepted after December 8th, 2025 at 11:59 pm.