

Core Curriculum Management

New Core Component Proposal

Date Submitted: 06/04/18 4:18 pm

Viewing: **MARS 431-W : Geological Oceanography-Earth's Climate**

Last edit: 07/09/18 1:05 pm

Changes proposed by: moserm

In Workflow

1. MARS Department Head
2. GV College Dean UG
3. W & C Preparer
4. W & C Advisory Committee Chair
5. Faculty Senate Preparer
6. Faculty Senate
7. Provost II
8. President
9. Curricular Services

Approval Path

1. 06/04/18 5:51 pm
Kyeong Park (parkk):
Approved for MARS Department Head
2. 07/09/18 1:07 pm
Donna Lang (langd):
Approved for GV College Dean UG
3. 08/10/18 1:13 pm
Donna Pantel (dpantel):
Approved for W & C Preparer
4. 08/10/18 1:18 pm
Donna Pantel (dpantel):
Approved for W & C Advisory Committee Chair

Contact(s)

Name	E-mail	Phone
Dr. Glenn A. Jones	jonesg@tamug.edu	409-741-4360

Course Prefix MARS Course Number 431

Academic Level UG

Complete Course Title Geological Oceanography-Earth's Climate

Abbreviated Course Title GEOL OCEANOGRAPHY-CLIMATE

Crosslisted With

Semester Credit Hour(s) 3

Proposal for:
Writing Designation

Writing Designation

Number of Sections per Academic Year 1 Enrollment per Section (Avg.) 30

Are the graded writing assignments evaluated by any assistants (i.e., GATs or undergraduates)? Yes

Who will evaluate them?

Grading is the overall responsibility of Dr. Jones with a GAT. The GAT grades each assignment for clarity, consistency with the assignment prompt, proper word choice, sentence structure, organization, etc. Dr. Jones then grades each paper for content (i.e. are appropriate references used and are they correctly used, are statements of fact correct, did the student correctly interpret the assignment prompt and were valid conclusions made, etc.). Each grade assignment is the responsibility of Dr. Jones.

If you are working with assistants (graduate or undergraduate included), briefly explain how you will monitor and supervise their work and what roles they will play in the teaching of writing.
See above.

All syllabi should contain one of the following statements. Select the statement that applies to your course.
To pass this course you must pass the W component.

List all graded writing assignments along with the approximate word count of each. (Note that for most 12-point fonts there are about 250 words on a page if double-spaced and 500 if single-spaced.) In addition, list the percentage of the final grade each assignment represents.

Writing assignment	Word count	% of final grade	Collaborative?
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Writing assignment	Word count	% of final grade	Collaborative?
Persuasive letter to President Trump (regarding Paris climate accord)	500	10	No
Continental and Oceanic archives of climate records. What are they, how are they used, how to identify.	750	10	No
Use Web of Science to identify the highest cited papers relating to "Snowball Earth" vs "Hothouse Earth" and compare their impact via number of citations and how has knowledge changed since initial publications.	1000	10	No
Using Web of Science to track citations to one of the fundamental climate papers from the 1970's. How has that paper been cited in subsequent decades, and how has understanding of that aspect of climate change evolved over time?	1000	10	No
Write survey Q's about climate knowledge, interview 10 individuals, analyze data, write "white paper" to THECB	1000	10	No
Final reflective paper on the three most important things learned during the semester including about climate and/or about personal growth in how the student study habits, learning skills, etc changed.	1250	10	No

Add word count of each graded writing assignment 5500
and put total word count here.

Add the percentage of final grade based on writing 50
and put the total percentage here.

Explain how collaboration is monitored to ensure equal participation.

Each time the course is offered the type of writing assignment remains the same, but the specific order (see above) and the specific content may change, as each assignment strives to be based on real-world events happening around the time that type of event is being covered in class lectures and in the text book. The assignments listed above were from the Spring 2017 class (Class is next offered Fall 2018). For example, the first writing assignment is always a persuasive letter. In Spring 2018 the assignment was to write a letter addressed to President Trump about why he should (shouldn't) pull out of the Paris Climate Accord. In Fall 2018, that assignment will still be a persuasive letter but may be a letter to TAMU President or TAMUG CEO or EPA Administrator Pruitt, etc. and will be about some controversial climate issue in the news at the beginning of the semester. Rarely is there a collaborative assignment. Sometimes a collaborative assignment (never more than one in a semester) will be given relating to the survey questions. When a collaborative assignment is given, 3-4 per group, each student is required to write a paragraph stating what they contributed to the group effort, then each of the other members are required to sign that paragraph certifying that they agree with the statement. In Spring 2017 there were no collaborative assignments.

Describe the formative feedback provided on student writing, especially on major assignments.

This course does not use drafts per se, rather it has always used a form of scaffolding in which each assignment builds on the previous assignments. The emphasis has always been on exposure to different writing styles that could be encountered or be expected to know in the discipline (e.g. persuasive letter, compare-contrast, "white paper", Survey instruments, analyzing and interpreting data, reflection). The first assignment is always a straight forward persuasive letter. The GAT and Dr. Jones pay close attention to this assignment in which very extensive use of "red pen" and margin notes is made. We also emphasize writing efficiently vs. "flowery" as science disciplines (which this course falls within) are known for getting to the point. This is one of the biggest "corrections" we deal with. Many students do not spend the time to think deeply enough about the assignment, produce an outline, write a draft then edit it before handing it in. As the semester progresses, there are fewer margin notes and red marks. The students do not redo each assignment with the exception of the persuasive letter (see below), rather the explicit expectation is that for the next assignment, the GAT/Instructor edits will have been taken to heart and incorporated (e.g. if formatting was incorrect, it will be looked at in the following assignment to insure it is being done correctly; if a student is using weak or incorrect words (marked as "wc" on the assignment, that type of writing is examined in following assignments; if wording is not "efficient" suggested changes are made in the early assignment, in later assignments general comments are made with the "offending" sentences circled, but we do not rewrite the sentence. In general, students get lots of feedback written on their assignments. Students are encouraged to submit a first draft of each assignment, but it is not required. Copies of every graded assignment are made and used when grading subsequent assignments to track the improvement (or lack of improvement) of each student. By the end of the semester, we very frequently see dramatic writing improvements (most clearly in organization and clarity in making an argument or reaching a conclusion. This is explicitly captured in the students having to redo the first assignment (so in effect the first assignment is the draft where we made extensive comments). After the course has nearly been completed, and the students have been exposed to the content of climate change, they are required to rewrite that first letter. The first (i.e. draft) is when they were writing largely from personal opinions with few hard facts about the climate system. The revised letter is based on their opinion but now having been exposed to facts about how Earth's climate works. This is a powerful lesson, as the students get to see how their writing has changed across the semester as they have gained specific knowledge relating to climate. In the additional comments below I have given several verbatim comments from the final reflective paper from the Spring 2017 class. These comments are supported by the copies of the assignments across the semester, where we see the improvements in black and white. These are also reflected in the two essay-type exams (which are not evaluated here as part of the W component, but are a reflection of content knowledge/competency).

Describe how you provide writing instruction.

In addition to the grading rubrics included in the syllabus, there are several writing-specific lectures, parts of lectures, and handouts. In the first week of the semester there is a lecture on plagiarism with handouts on examples of plagiarism from the most egregious form to more subtle forms that oftentimes are hard for students to grasp. There is a 1/2 class lecture on resources such as Purdue OWL, and the specifics related to each assignment are linked to this site throughout the semester. We spend about 1/2 lecture on the uses of database searching (i.e. Web of Science), showing how to use it, including some of the more sophisticated search tools to find the papers that will lead to strengthening their assignment. At least two of the writing assignments during the semester require explicit uses of Web of Science. We give specific editorial notation/comments relating to each and every assignment.

Additional Comments Selected comments from final reflective papers last time the course was offered in Spring 2017.

"Although there were a multitude of learning experiences from this course, the final thing that has made an impact on my education is critical thinking from studying.... With each chapter that was covered, I created a summary of key points and topics that were covered in lecture. After I made a summary for each chapter, I would then relate chapters to one another."

"The written assignments for this course required several hours' worth of research, therefore finding relevant, scholarly sources was vital. In order to produce quality work, I had to analyze the prompts for each assignment. This process forced me to judge how relevant the information was when searching for information."

"It became clear to me from this that scientific work builds slightly on previous work until a full understanding is gained, and that for climate sciences at least, breakthroughs with no prior supporting data are almost completely unheard of. This helped give me a better idea of what the process is for being published and having one's work respected as a scientist." (Note: a good reflective comment on how the student's opinion/focus change in the persuasive letter assignment as more knowledge was obtained across the semester).

"For example, just knowing that there are various orbital cycles, triggers me to remember that insolation values can fluctuate, in turn explaining the abnormally wet summer monsoon. You could make connections between concepts for days. Once I began stringing concepts together, it felt like a light bulb going off. Part of me wishes I had taken this class earlier on in my college career."

"...this is why we were required to use Web of Science (WoS) so extensively throughout the course. Each writing assignment required a more in-depth specified search on WoS (Note: this a good reflection on the structure of each assignment building on earlier assignments). This developed my research skills far beyond where they were at the beginning of the semester."

"On the whole this class has prepared me for my future more than a class that only required me to take tests. I have gained the skills I need to write in the future because it is very likely that any job I will get will require writing of some kind. Learning to write for all the different kinds of assignments we had in the class was truly beneficial because it required me to branch out and do something other than the standard paper... This class was definitely not easy but neither will being in the work force. I now feel confident that I can provide any sort of write up needed in the future..."

"In the first lecture of MARS 431, plagiarism was discussed in more depth than I had ever experienced. It would have been very useful to receive that information at an earlier time in school. Teachers have always expressed plagiarism as wrong; however, I never knew all the variations of plagiarism and how quickly it becomes complicated.... The first lecture was truly enlightening on this topic and I'm glad that I feel much more confident in being able to properly cite someone else's work."

"This course challenged me in a way that I hadn't experienced during the entirety of my undergraduate career. No matter how well prepared I felt on the concepts, the exam questions proved to marry those concepts to a deeper level of evaluation that left me frustrated, and if I'm being honest sometimes infuriated with myself.... My feelings for the challenges I've gone through in this class can be summarized by the great Ernest Hemingway: 'There is nothing noble in being superior to your fellow man; true nobility is being superior to your former self.'" (Note: this student recognized how one of the ways assessment is structured in this course. We use Bloom's taxonomy and/or Baxter-Magolda's Ways of Knowing to insure assessments are at the right level of difficulty for a senior-level class, and then we always "push" the students with a question or two or a component of a written assignment that is at the next level of knowing (i.e. Absolute, transitional, independent, contextual), where most students will be at the transitional level, and we will ask some independent level questions.).

"Another thing I learned from this course is the power of studying. This is the first course I have taken that basically required reading the textbook, the whole textbook. I remember the day before the first exam, I finally broke down and bought a copy of the book. I then proceeded to spend that entire day trying to digest the first seven chapters, and it showed when I saw my test grade... I didn't really change the amount of time I studied, but I did change how I studied. I kept up with lecture topics and supplemented them with reading. I made notes from the book and used those to slowly take in the vast amount of information for the second exam. I think I was the only person in the class that thought the second exam was easier than first, proving that proper studying helps!... This class was more difficult than I had imagined, but that was actually refreshing. I completely appreciated taking a test without using a scantron, I thought it helped me absorb the information better than trying to focus on an A, B, C, D, or E answer."

"This course forced me to step out of my comfort zone as a future scientist, researcher, and as a writer. I was presented with new ways of thinking and analyzing topics that I had previously had little experience. I was challenged to discuss these topics in a professional way... As I complete this paper and my final semester as a graduating senior, I truly feel as if this course helped me become a better critical thinker, writer and prepare me to step into a career in natural science."

"Writing research papers has always been an overwhelming task for me during my years in school. I never knew where to start, what to search, or even how to fully elaborate on the subject that i was writing about. I had trouble with writing succinct but informative papers... I still have a lot of work when it comes to using the correct words and explanations, But over the course of the class, I have become more confident in my use of Web of Science and other databases. It is almost like a secret code that you finally break..."

Please ensure that the attached course syllabus sufficiently and specifically details the appropriate core objectives.

Attach Course Syllabus [MARS 431 Syllabus Fall2018.docx](#)

Reviewer Comments **Valerie Balester (v-balester) (05/22/18 3:45 pm):** Rollback: Emailed Glen regarding formative feedback and assignments.

Donna Pantel (dpantel) (08/10/18 1:13 pm): REPORT ON RECERTIFICATION OF W COURSE: MARS 431 We recommend that MARS 431 Geological Oceanography: Earth's Climate be certified as a writing (W) course for four academic years (9/19 to 9/23). We have reviewed a representative syllabus and have determined that the course meets or exceeds the following criteria: 1. Percentage of final grade based on writing quality: 50 2. Course content appropriate to the major 3. Total number of words: 5500 4. Instructor to student ratio for one section: 1:15 Since original certification, the course has not changed significantly. A Graduate Assistant Teacher helps with this course. The writing assignments are all related to climate change issues and familiarize students with argument, the archive of climate records, the Web of Sciences and how citations work. They write a persuasive letter, write a paper on climate change based on survey research they conduct, and a reflection to wrap up the semester. These assignment change, with one collaborative assignment being given on occasion. In that case, each student is required to do and certify individual writing. Students are required to revise their first assignment (the letter) at the end of the semester, after receiving extensive feedback throughout the semester that is tracked to ensure they are using suggestions. Instruction occurs with several writing-specific lecture and handouts, for example on plagiarism, writing resources, and database searching.

MARS 431 – Geological Oceanography – Earth’s Climate

Fall 2018

Text:

Earth’s Climate: Past and Future by William F. Ruddiman (2014, third edition).

Also, there will be selected readings from the peer-reviewed literature on topics related to the various writing assignments.

Instructor:

Dr. Glenn A. Jones (e-mail jonesg@tamug.edu, office phone 741-4360, cell phone 392-1665)

Office Hours: My office is in OCSB Rm 356. I will have formal office hours from 2p – 4p on MTW. Or you can email, phone or see me after class to set an appointment if another time is more convenient.

Raven Walker is the TA for the class. Her email is rwalke09@email.tamu.edu. Her desk is also on the 3rd floor of OCSB directly opposite the entrance to the MARS faculty and graduate student suite.

Class Meeting times/location:

MW 12:30 – 1:45 pm, Location: TBA

Goals and Objectives:

MARS 431 covers the paleoceanographic/climate change aspects of Geological Oceanography. This course will examine the different forces that have influenced Earth's climate from long-term, large scale tectonic changes; to external orbital forcing; to internal millennial-scale changes. By studying the different forces that have influenced natural changes in Earth’s climate we will develop a better understanding of the mechanism and scale of anthropogenic changes to Earth’s climate.

MARS 431 is a writing intensive (W) course that satisfies the writing requirement for both the MARS and OCRE degrees. As such, all assignments are graded with attention to content (i.e. the science part of the course) and writing (i.e. grammar, syntax, clarity, organization, etc), and it should go without saying that there will be more writing than you experience in other classes.

Assessment (i.e. grades):

Grades will be based on two in-class essay exams, five take-home writing assignments, and a 5- page (double-spaced) course summary project.

Learning Outcomes:

MARS 431 is an upper-level writing-intensive course. As such, several learning outcomes will be achieved with the successful completion of this course. By the end of the semester students will be able to:

- Articulate the major theories, concepts, principles of Earth's Climate.
- Synthesize knowledge across several courses within the MARS and/or OCRE programs in order to formulate an understanding of the processes controlling the evolution of Earth's Climate.
- Evaluate, analyze, and integrate information from a variety of sources including peer-reviewed publications, government reports and newspapers to understand to broader impact that climate has on society and policy.
- Develop critical, reasoned positions by comparing/contrasting several of the early climate hypotheses (some now widely accepted as correct and some now known to be incorrect) and some of the contemporary unresolved hypotheses within this field.
- Demonstrate effective writing skills through assignments requiring range of different writing styles (e.g. persuasive letter, proposal writing, white paper, lesson plans, letter to the editor, critical review of a published study).
- Present work effectively to a range of audiences through writing assignments directed to professional, business and general public audiences.
- Exhibit the skills necessary to acquire, organize, reorganize, and interpret new knowledge by using databases such as Web of Science for peer-reviewed literature, and USGS or NOAA databases for present and past climate and model predictions of climate change.
- Demonstrate intellectual curiosity by formulating scientifically rigorous questions about Earth's climate and searching broadly through a wide range of databases for answers.

Grading and Final grade assignment:

A = 90+, B = 80 - 89, C = 70 - 79, D = 60 - 69, F = below 60

Two in-class essay exams will constitute 50 points of the final grade (i.e. 2x25 pts ea.). Five take-home writing assignments will constitute 50 points of the final grade (i.e. 5x10 pts ea.). Also, there will be a five page (double-spaced) course summary project worth 10 pts of the final grade. The lowest grade of the five take-home assignments will be dropped (see details under Misc. 1a below).

Note: to pass this course you must pass the W component.

Tentative Schedule (Lectures are largely from the "Earth's Climate" book):

Week 1: Overview of Climate Science (Ch 1).

Week 2: Earth's Climate System Today (Ch 2).

Week 3: Climate Archives, Data and Models (Ch 3).

Week 4: CO₂ & Long-term Climate (Ch 4) / Plate Tectonics & Long-term Climate (Ch 5).

Week 5: Greenhouse Climate (Ch 6).

Week 6: Greenhouse to Icehouse (Ch 7) / Astronomical Control Solar Radiation (Ch 8).

Week 7: Astronomical Control of Solar Radiation (Ch 8).

Exam 1

Week 8: Insolation Control of Monsoons (Ch 9) and Insolation Control of Ice Sheets (Ch 10).

Week of No Class, Spring Break.

Week 9: Orbital-scale Changes in CO₂ & CH₄ (Ch 11) and Orbital-scale Interactions (Ch 12).

Week 10: Orbital-scale Interactions (Ch 12) and Last Glacial Maximum (Ch 13).

Week 11: Last Glacial Maximum (Ch 13) & Last Deglaciation (Ch 14).

Week 12: Millennial Oscillations (Ch 15) & Preindustrial Climate (Ch 16).

Week 13: Climate Changes During Last 1000 Years (Ch 17) & Climate Changes Since 1850 (Ch 18).
Week 14: Causes of Warming over the Last 125 Years (Ch 19). Future Climate Change (Ch 20).

Exam 2

Week 15: No final exam, but a five page reflective paper will be due (electronic submission to my email (jonesg@tamug.edu) no later than 12Noon on Friday, the first day of finals. Note: The earlier you can submit this paper, the better. This is especially true if you are a graduating senior.

Misc:

- 1) a) You will note above that there are 110 assignable points. I will drop the lowest of the five take-home assignment grades you receive, but you have to hand-in an assignment that you have clearly made an effort to complete and have it graded to be eligible for the drop (i.e. if you do not hand in an assignment it is a zero and that grade will not be dropped. If you hand in an assignment in which you clearly did not make a reasonable effort to complete, it will be graded and will not be dropped).
 - b) The final 5-page assignment is required and cannot be used as a drop.
 - c) Also, the dates of the two exams are known well in advance and if you have a conflict you will need to work on resolving it now.
- 2) The lecture schedule given above is for the 20 chapters in the “Earth’s Climate” book.
- 3) Here are some guidelines you should follow for the writing assignments:
- a. Be prepared to hand in assignments at the beginning of class.
 - b. Be neat and orderly in completing your work.
 - c. Use the “scoring rubric” (see below) to help you organize your papers, answers and/or solutions. Write such that each assignment will be clear to the “average enlightened reader.”
 - d. Make sure any graphs and units are completely labeled. Use APA format for references.
 - e. Late assignments will receive a 1-point deduction for each class that the assignment is late (i.e. if assignment is due on a Wednesday and you hand it in on the following Monday there will be a 1-point deduction, if you hand it in on the following Wednesday there would be a 2-point deduction, etc.). If an assignment is not handed in within 2 weeks (that would be a 4-point deduction) of the due date, it will not be graded, will be assigned a zero AND it will not be used for a dropped assignment grade.
 - f. **Plagiarism will not be tolerated, no exceptions.** Plagiarism is a serious issue in academia, and in work place. There are major negative consequences for those who are found to have plagiarized. Be sure you understand the different forms that plagiarism can take (It will be discussed, along with handouts on the first week of class. Please be sure to pay attention, take notes, and/or ask questions). Any assignment that is found to contain plagiarized material will result in either an F (i.e. 0) for the assignment or an F for the course.

THE AMERICANS WITH DISABILITIES ACT:

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 contact the Counseling Office, Seibel Student Center, or call (409)740-4587. For additional information visit <http://www.tamug.edu/counsel/Disabilities.html>

ACADEMIC INTEGRITY:

For many years Aggies have followed a Code of Honor, which is stated in this very simple verse: "Aggies do not lie, cheat, or steal, nor do they tolerate those who do."

Please refer to the Honor Council Rules and Procedures on the web <http://www.tamug.edu/honorsystem> for more information.

Statement on Absences (Attendance):

Information concerning absences is contained in the University Student Rules Section 7 (http://www.tamug.edu/stulife/Academic_Rules/7_Attendance.html). The University views class attendance as an individual student responsibility. All students are expected to attend class and to complete all assignments. Please consult the University Student Rules for reasons for excused absences, detailed procedures and deadlines as well as student grievance procedures (Part III, Section 45).

Make-up Policy:

If an absence is excused, the instructor will either provide the student an opportunity to make up any quiz, exam or other work that contributes to the final grade or provide a satisfactory alternative by a date agreed upon by the student and instructor. If the instructor has a regularly scheduled make up exam, students are expected to attend unless they have a university approved excuse. The make-up work must be completed in a timeframe not to exceed 30 calendar days from the last day of the initial absence. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for the absence. Reasons for absences that are considered excused by the university are found in Student Rule 7 (http://www.tamug.edu/stulife/Academic_Rules/7_Attendance.html). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

FAMILY EDUCATIONAL AND RIGHTS TO PRIVACY ACT (FERPA):

FERPA is a federal law designed to protect the privacy of educational records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. To obtain a listing of directory information or to place a hold on any or all of this information, please consult the Admissions & Records Office. Items that can never be identified as public information are a student's social security number or institutional identification number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your confidentiality.

MARS 431: NOMINAL SCORING RUBRIC FOR WRITTEN EXAM QUESTIONS

(There will be 2 essay exams each comprising 5-6 questions. Each exam is worth 25 points toward the overall course grade)

Grade criteria per question (0-10 scale):

10 (A) questions answered completely; logic of solution is clear; factual information is correct; all calculations are free of errors; conclusions are accurate.

8 (B) questions answered with some supporting documentation; logic of solution may have minor lapses; factual information is essentially correct, although not always clear; calculations may have minor errors; conclusions are essentially correct within a reasonable deviation.

6 (C) questions answered; logic of solution may have large uncertain components; some factual information is missing; calculations show some errors; conclusions deviate from the desired path.

4 (D) questions not answered completely; logic of solution difficult to follow; factual information not always correct or shown; calculations have large errors; conclusions not always within the realm of reasonable deductions.

<3 (F) questions are mostly not solved; logic of solution is unclear; information is missing or incorrect; calculations have large errors; conclusions are unreasonable.

Criteria Analysis

Logic _____

Information _____

Calculations _____

Conclusions _____

MARS 431: SCORING RUBRIC FOR WRITTEN TAKE-HOME ASSIGNMENTS

(There will be 5 take-home writing assignments @ 10 points ea.)

Grade criteria

10 (A) abstract is clear and complete; introduction lays out hypotheses and background information is thorough; methods are explained and documented carefully; results are presented logically and accurately with supporting tables, graphs and figures; discussion convincingly explains relationships, relates results to other studies, tests hypotheses and comments upon anomalous results ; conclusions flow logically from the exposition; references are comprehensive and cited correctly.

8 (B) abstract is clear with minor omissions; introduction states the problem with authority, background is sufficient to support the objectives; methods are mostly explained and documented although questions exist about some procedures; results are usually clear and accurate with supporting tables, graphs and figures, although there may be small discrepancies; discussion explains relationships, relates results to other studies and tests hypotheses, although anomalous results may not be satisfactorily explained; conclusions are defensible in the context of the paper; references are cited correctly.

6 (C) abstract may lack one or two components of the project; introduction mentions the problem but context may not be certain, some background information is given; methods are explained but documentation may not be complete; results are clear with some tables, graphs and figures, but questions about data remain; discussion generally follows the results, although explanations may not be entirely justified; conclusions are logical but not completely obvious; references are cited, but some may be incomplete.

4 (D) abstract too vague; introduction does not put the problem into the proper context and there is minimal background information; documentation of methods has major deficiencies; results raise significant questions and lack important tables, figures and graphs; discussion wanders from the results, although explanations are still mostly correct; conclusions are logical but not always justifiable; references show lapses in documentation.

<3 (F) abstract incomplete; introduction does not develop objectives; background information is absent; documentation of methods is unclear or incorrect; results poorly explained, improperly illustrate and have significant inaccuracies ; discussion is a poor explanation of the results; conclusions are not obvious; significant references are missing or incorrectly cited.

Criteria Analysis

Abstract_____

Discussion_____

Introduction_____

Conclusion_____

Methods_____

References_____

Results _____

MARS 431: Course Summary (Written assignment, 10 points)

Due Date: Electronic submission to my email (jonesg@tamug.edu) no later than 12 pm Fri., the first day of final exams.

Course Summary: As the last component of the course I want you to write a brief summary of the three most significant learning experiences that have resulted from this course. These can be related to the topics covered in class, the projects you have done on your own, some new curiosity about the Earth that has resulted from your exploration of Earth's climate, and/or about your own personal learning/ thinking. At least 5 (double-spaced, 1" margins, 12 point font) pages are required, but longer is acceptable. Be sure to support your reflection with the specific evidence (citing references with APA formatting) that will help me evaluate your understanding of the subject, and comment on the techniques that were most helpful in your learning of each concept. Use the following rubric to guide you. Do not just go through the semester and give me a list (with some text) about the things we covered. I need to see some thought and insight.

MARS 431: SCORING RUBRIC FOR COURSE SUMMARY

(1 individual-effort five-page paper @ 10 points)

Grade criteria

10 (A) Demonstrates a thorough understanding of major concepts; supports that understanding by giving specific examples that illustrate how the processes work; shows a sophisticated ability to reach conclusions and make interpretations based upon an analysis of the data; reflects upon the reasons for the successful learning; writing is an example of literacy and clarity.

8 (B) Major concepts are outlined although there may be some minor inconsistencies; specific examples illustrate how the processes work, but they may not be entirely applicable; shows a solid ability to reach conclusions and make interpretations based upon an analysis of the data; some commentary about the reasons for the successful learning; writing has only minor mistakes.

6 (C) Major concepts are outlined but their explanation is not always consistent; examples given are appropriate, but not properly connected to the concept; conclusions and interpretations are correct but connections to data are unclear; commentary about the reasons for the successful learning is not explicit; writing is good but hampered by mistakes in grammar and syntax.

4 (D) Major concepts are stated imperfectly, examples are not completely relevant; conclusions or interpretations indicate misconceptions; statement about learning incomplete; writing contains significant errors in grammar and syntax.

<3 (F) Poor or incorrect statement of concepts; examples not provided; interpretations not based upon facts; statement on learning absent; writing is poor and ungrammatical.