

**The University of Michigan**  
**College of Engineering**  
**Curriculum Committee**  
**January 12th, 2016- 1:30-3:00 p.m.**  
**1180 Duderstadt Center**

*Supporting Staff present– Amber Dryden*

**Attending**

Brian Noble, Igor Markov, Luis Bernal, John Boyd, Susan Montgomery, Jamie Phillips, Fred Terry, Yavuz Bozer, Richard Robertson, Tassos Perakis, Edward Larson, Terese Olson, David Bielski (ESG), Mark Moldwin (guest), Kathleen Sienko (guest), MariaRose Young (guest)

**Notes/Minutes**

1. Dean Noble announced the selection of the CoE Curriculum Committee Chair for WT 2016. **Fred Terry** was selected and approved as **Chair** by committee members.
2. December 1<sup>st</sup> meeting minutes **APPROVED**.
3. Modification to SUGS program. Presented by Igor Markov. Change to application deadlines to SUGS for CSE students. Considered a program change. This is only a change to the deadlines. Modification **APPROVED** unanimously.
4. Proposal- Program in Global Health Design (PGHD). Presented by Kathleen Sienko. Trying to offer an option to students that is nine credits compared to a minor or concentration. Notation of completion will be on the student's transcript. Some discussion regarding wording used in proposals. Susan Montgomery mentions that this is considered "specialized studies" or a "mini-minor". Some discussion regarding what students design. Committee recommends some minor revisions. Proposal decision **TABLED** to next meeting. Please submit any updated documentation by 1/27/16.
5. Proposal- Program in Socially Engaged Design (PSED). Presented by Kathleen Sienko. Similar discussion to PGHD proposal. Committee recommends some minor revisions. Proposal decision **TABLED** to next meeting. Please submit any updated documentation by 1/27/16.

**CARF DECISIONS**

SUBJECT	Course #	ACTION	EFFECTIVE TERM	Approved	Notes Regrading CARFs	TABLED
CHE	530	DELETE	WT 2016	X		
EECS	280	MOD	FT 2016	X	Presented by Igor Markov. Modification - adding lab content formally to the class type. Instructors have been using this approach for the past two years with success. CSE is replacing one-hour discussions in EECS 280 & 281 with two-hour labs. Laptops are needed for assignments, and provided through Department Computing Organization to those few students who do not own one. (SIGNATURE NEEDED FOR PROCESSING as of 1/20/16 AD)	
EECS	281	MOD	FT 2016	X	Presented by Igor Markov. Modification - adding lab content formally to the class type. Instructors have been using this approach for the past two years with success. CSE is replacing one-hour discussions in EECS 280 & 281 with two-hour labs. Laptops are needed for assignments, and provided through Department Computing Organization to those few students who do not own one. (SIGNATURE NEEDED FOR PROCESSING as of 1/20/16 AD)	

EECS	595	MOD	WT 2016	X	Presented by Igor Markov. Modification to reflect changes occurring in field since old description was written. (SIGNATURES NEEDED FOR PROCESSING as of 1/20/16 AD)	
NAVARCH	280	MOD	WT 2016	X	Presented by Tassos Perakis.	
NAVARCH	461	MOD	WT 2016	X	Presented by Tassos Perakis. Recommended that level of credit be changed to "all credit types". Please send revised form for processing if that is desired.	
CLIMATE	102	MOD	FT 2016	X	CLaSP changes presented by Mark Moldwin. All changes were <b>APPROVED</b> .	
CLIMATE	105	MOD	FT 2016	X		
CLIMATE	171	MOD	FT 2016	X		
CLIMATE	172	MOD	FT 2016	X		
CLIMATE	280	MOD	FT 2016	X		
CLIMATE	320	MOD	FT 2016	X	Committee asked that for CLIMATE 320 the last sentence in the course description be removed. "Required for CLIMATE/SPACE/EARTH 321, which Introduces Earth and Space Systems dynamics". This prerequisite should be mentioned in the prerequisite box for CLIMATE 321. This is approved pending updated forms.	
CLIMATE	321	MOD	FT 2016	X	Committee asked that for CLIMATE 320 the last sentence in the course description be removed. "Required for CLIMATE/SPACE/EARTH 321, which Introduces Earth and Space Systems dynamics". This prerequisite should be mentioned in the prerequisite box for CLIMATE 321. This is approved pending updated forms.	
CLIMATE	323	MOD	FT 2016	X		
CLIMATE	350	MOD	FT 2016	X		
CLIMATE	370	MOD	FT 2016	X		
CLIMATE	380	MOD	FT 2016	X		
CLIMATE	381	MOD	FT 2016	X		
CLIMATE	401	MOD	FT 2016	X		
CLIMATE	405	MOD	FT 2016	X		
CLIMATE	410	MOD	FT 2016	X		
CLIMATE	411	MOD	FT 2016	X		
CLIMATE	414	MOD	FT 2016	X		
CLIMATE	422	MOD	FT 2016	X		
CLIMATE	440	MOD	FT 2016	X		
CLIMATE	441	MOD	FT 2016	X		
CLIMATE	442	MOD	FT 2016	X		
CLIMATE	451	MOD	FT 2016	X		
CLIMATE	462	MOD	FT 2016	X		
CLIMATE	466	MOD	FT 2016	X		
CLIMATE	467	MOD	FT 2016	X		
CLIMATE	474	MOD	FT 2016	X		
CLIMATE	475	MOD	FT 2016	X		
CLIMATE	476	MOD	FT 2016	X		
CLIMATE	478	MOD	FT 2016	X		
CLIMATE	480	MOD	FT 2016	X		

CLIMATE	498	MOD	FT 2016	X		
CLIMATE	<b>499</b>	MOD	FT 2016	X		
CLIMATE	501	MOD	FT 2016	X		
CLIMATE	524	MOD	FT 2016	X		
CLIMATE	551	MOD	FT 2016	X		
CLIMATE	563	MOD	FT 2016	X		
CLIMATE	564	MOD	FT 2016	X		
CLIMATE	575	MOD	FT 2016	X		
CLIMATE	576	MOD	FT 2016	X		
CLIMATE	578	MOD	FT 2016	X		
CLIMATE	591	MOD	FT 2016	X		
CLIMATE	592	MOD	FT 2016	X		
CLIMATE	605	MOD	FT 2016	X		
CLIMATE	606	MOD	FT 2016	X		
CLIMATE	651	MOD	FT 2016	X		
CLIMATE	747	MOD	FT 2016	X		
CLIMATE	749	MOD	FT 2016	X		
SPACE	101	MOD	FT 2016	X		
SPACE	103	MOD	<b>WT 2017</b>	X		
SPACE	204	MOD	FT 2016	X		
SPACE	477	MOD	FT 2016	X		
SPACE	495	MOD	FT 2016	X		
SPACE	<b>499</b>	MOD	FT 2016	X		
SPACE	574	MOD	FT 2016	X	Note that signed version on file is not yet signed by AERO.	
SPACE	583	MOD	FT 2016	X		
SPACE	598	MOD	FT 2016	X		

UNIVERSITY OF MICHIGAN  
College of Engineering  
Curriculum Committee Meeting  
Tuesday, January 12, 2016 – 1:30-3:00pm  
Location: 1180 Duderstadt Center

**NEXT MEETING:** Tuesday, February 2, 2016, 1:30-3:00pm,  
Room 1180, Duderstadt Center

**AGENDA**

1. Dean Noble - Selection/election of new Chair for Curriculum Committee
2. Recap of Dec. 1st meeting. Approval of mtg. minutes? (Page 4-6)
3. Modification to SUGS program. Change to application deadlines to SUGS for CSE students. Program change. (Page 7-9)
4. Program Proposal- Program in Global Health Design (PGHD) (Page 10-12)
5. Program Proposal- Program in Socially Engaged Design (PSED) (Page 13-17)
6. Summarizing document for CLaSP- CLIMATE & SPACE changes (Page 30-31)

**CARF SUMMARIES**

Page	SUBJECT	Course #	ACTION	SUMMARY	EFFECTIVE TERM	MIN. GRADE REQ. FOR ENF. PREPREQ	Approved	Revise CARF	TABLED
18-19	CHE	530	DELET	Deletion of course	WT 2016				
20-21	EECS	280	MOD	Class type - adding lab	FT 2016	"C"		Signature needed	
22-23	EECS	281	MOD	Class type - adding lab	FT 2016	"C"		Signature needed	
24-25	EECS	595	MOD	Description, Prereq, Level of Credit	WT 2016			Signature(s?) needed	
26-27	NAVARCH	280	MOD	Prereq	WT 2016				
28-29	NAVARCH	461	MOD	Cross listing, Course title, prereq,	WT 2016				
32	CLIMATE	102	MOD	Subject change, cross-listed info.	FT 2016			When are all of these changes taking place WT 2016/FT 2016/another term? To be discussed at mtg.	
33	CLIMATE	105	MOD	Subject change, cross-listed info.	FT 2016				
34	CLIMATE	171	MOD	Subject change, cross-listed info.	FT 2016				
35	CLIMATE	172	MOD	Subject change, cross-listed info., class type	FT 2016				
36	CLIMATE	280	MOD	Subject change, cross-listed info., course description	FT 2016				
37	CLIMATE	320	MOD	Subject change, cross-listed info., title, course description, prereq, level of credit	FT 2016	"C"			
38	CLIMATE	321	MOD	Subject change, cross-listed info., title, prereq, level of credit	FT 2016				
39	CLIMATE	323	MOD	Subject change, cross-listed info.	FT 2016				
40	CLIMATE	350	MOD	Subject change, cross-listed info.,	FT 2016				

				credit hours offered					
41	CLIMATE	370	MOD	Subject change, cross-listed info.	FT 2016				
42	CLIMATE	380	MOD	Subject change, cross-listed info., credit hours offered.	FT 2016				
43	CLIMATE	381	MOD	Subject change, cross-listed info., course description, prereq.	FT 2016	"C"			
44	CLIMATE	401	MOD	Subject change, cross-listed info., prereq., credit hours offered	FT 2016				
45	CLIMATE	405	MOD	Subject change, cross-listed info., course description	FT 2016				
46	CLIMATE	410	MOD	Subject change, cross-listed info., prereq	FT 2016				
47	CLIMATE	411	MOD	Subject change, cross-listed info., prereq	FT 2016				
48	CLIMATE	414	MOD	Subject change, cross-listed info., prereq	FT 2016				
49	CLIMATE	422	MOD	Subject change, cross-listed info., prereq	FT 2016				
50	CLIMATE	440	MOD	Subject change, cross-listed info., prereq	FT 2016				
51	CLIMATE	441	MOD	Subject change, cross-listed info. (?), prereq	FT 2016				
52	CLIMATE	442	MOD	Subject change, cross-listed info., prereq	FT 2016	"C"			
53	CLIMATE	451	MOD	Subject change, cross-listed info., prereq	FT 2016				
54	CLIMATE	462	MOD	Subject change, cross-listed info., prereq	FT 2016				
55	CLIMATE	466	MOD	Subject change, prereq	FT 2016				
56	CLIMATE	467	MOD	Subject change, cross-listed info.,	FT 2016				
57	CLIMATE	474	MOD	Subject change	FT 2016				
58	CLIMATE	475	MOD	Subject change, cross-listed info.	FT 2016				
59	CLIMATE	476	MOD	Subject change, prereq	FT 2016				
60	CLIMATE	478	MOD	Subject change	FT 2016				
61	CLIMATE	480	MOD	Subject change	FT 2016				
62	CLIMATE	498	MOD	Subject change, cross-listed info., course title, course description,	FT 2016				
63	CLIMATE	<b>499</b>	MOD	Subject change	FT 2016			Does a new course need to be created for one of the two 499 courses? Both are listed as MOD.	
64	CLIMATE	501	MOD	Subject change, course description	FT 2016				

65	CLIMATE	524	MOD	Subject change, prereq	FT 2016				
66	CLIMATE	551	MOD	Subject change, cross-listed info., title, class type (?)	FT 2016	"C"			
67	CLIMATE	563	MOD	Subject change, prereq.	FT 2016				
68	CLIMATE	564	MOD	Subject change, cross-listed info., prereq.	FT 2016				
69	CLIMATE	575	MOD	Subject change, cross-listed info., prereq.	FT 2016				
70	CLIMATE	576	MOD	Subject change, prereq.	FT 2016				
71	CLIMATE	578	MOD	Subject change, cross-listed info., prereq.	FT 2016				
72	CLIMATE	591	MOD	Subject change	FT 2016				
73	CLIMATE	592	MOD	Subject change, course description	FT 2016				
74	CLIMATE	605	MOD	Subject change, cross-listed info., title, description,	FT 2016				
75	CLIMATE	606	MOD	Subject change, cross-listed info., prereq.	FT 2016				
76	CLIMATE	651	MOD	Subject change, prereq.	FT 2016				
77	CLIMATE	747	MOD	Subject change, cross-listed info., title, description	FT 2016				
78	CLIMATE	749	MOD	Subject change, cross-listed info., title, description	FT 2016				
79	SPACE	101	MOD	Subject change, cross-listed info.	FT 2016				
80	SPACE	103	MOD	Subject change, cross-listed info.,	WT 2017				
81	SPACE	204	MOD	Subject change, cross-listed info.	FT 2016				
82	SPACE	477	MOD	Subject change, prereq.	FT 2016	"C"			
83	SPACE	495	MOD	Subject change, prereq.	FT 2016				
84	SPACE	499	MOD	Subject change	FT 2016				
85	SPACE	574	MOD	Subject change	FT 2016			Signed version received not yet signed by AERO	
86	SPACE	583	MOD	Subject change, cross-listed info., prereq.	FT 2016	"C"			
87	SPACE	598	MOD	Subject change	FT 2016				

**The University of Michigan**  
**College of Engineering**  
**Curriculum Committee**  
**December 1st, 2015- 1:30-3:00 p.m.**  
**1180 Duderstadt Center**

*Supporting Staff present– Betsy Dodge & Amber Dryden*

**Attending**

Brian Noble, Kevin Compton, Alberto Figueroa , Susan Montgomery, Jamie Phillips, Fred Terry, Yavuz Bozer, Richard Robertson, Tassos Perakis, Edward Larson, Erik Hildinger, Mikhail Zolikoff (guest), Jeffrey Scruggs (guest), Aaron Crum (guest), Steven Skerlos (guest), David Bielski (ESG)

**Notes/Minutes**

1. Kevin Compton announced that the CoE CC chair is pending and will be announced next term (WT 2016).
2. November 17<sup>th</sup> meeting minutes **APPROVED**. Committee was in approval of printing multiple pages on each side of the pages in the agenda. It is already printed front & back.
3. Committee **requested that a meeting be scheduled for January 12<sup>th</sup> 2016**.
4. Committee **requested that CLASP send a representative** to take up changes in the CLASP CARFs. All CARFs were tabled.
5. Committee revisited the need for a new Course Approval Request Form (CARF). Suggested looking back at a previously updated version of the form that was not implemented. Discussed with Dean Noble a form being used by the Scholastic Standing Committee (SSC), and the desire to move away from using FileMaker.

**CARF DECISIONS**

SUBJECT	Course #	ACTION	EFFECTIVE TERM	Approved	Notes Regarding CARFs	TABLED
MECHENG	489	NEW	WT 2016	X	Presented by Steven Skerlos. This course is to address the need to create a separate course specifically for ME students. It will require Thermodynamics for students to take it (Prereq: ME 235, C- or above). The Energy & Climate sections are taught differently compared to CEE 265. Includes a ME design project that is considered light compared to design projects for other ME courses. Credit for only one: CEE 265 or ME 489.	
EECS	504	NEW	FT 2015 (UPDATED TO FT 2016)	X	Presented by Jamie Phillips. Course is intended for graduate/doctorate students. Credit for only one: EECS 504 or EECS 442. EECS would like to include non-Rackham & Rackham Grad students. Form was updated to include both. Form was also updated to say Fall 2016 (instead of Fall 2015). New faculty teaching it –Jason Corso. (UPDATED FORM ALREADY RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	510	NEW	WT 2016	X	Presented by Mikhail Zolikoff. ENTR are elective credit courses for CoE students. Courses are intended to complement CoE degrees. ENTR would like to eventually be able to present a certificate for these courses and others. Courses are not cross-listed with business school courses. This course includes information in the space of Compensation, Funding, and Ownership. Committee discussed the removal of “Your Fair Share” from the title. ENTR would like to update the CARF prerequisite to Senior or	

					Graduate Standing. Restricting courses to students with 84 credits or above, or graduate standing. Committee discussed that exceptions can always be made for exceptional students not at this level/standing who would like to take the courses. These are 7 week course instead of a 14 week courses, so more information is covered over a shorter period of time. (UPDATED FORM ALREADY RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	520	NEW	WT 2016	X	Presented by Mikhail Zolikoff. (UPDATED FORM ALREADY RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	530	NEW	WT 2016	X	Presented by Mikhail Zolikoff. (UPDATED FORM ALREADY RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	540	NEW	WT 2016	X	Presented by Mikhail Zolikoff. Committee discussed that the abbreviation needs to be consistent with the course title. Committee advised against including "The Numbers That Matter" in the title. Agreement reached that the course title should be updated to "Business Math for Innovators". Committee advised to put "All credit types" for all of the CARFs, and A-E for the grading scale. As well as, all to say senior or graduate standing (enforced). Other students can register/take with permission. (UPDATED FORM ALREADY RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
CLIMATE	102	MOD	WT 2016			X
CLIMATE	105	MOD	WT 2016			X
CLIMATE	171	MOD	WT 2016			X
CLIMATE	172	MOD	WT 2016			X
CLIMATE	280	MOD	WT 2016			X
CLIMATE	320	MOD	WT 2016			X
CLIMATE	321	MOD	WT 2016			X
CLIMATE	323	MOD	WT 2016			X
CLIMATE	350	MOD	WT 2016			X
CLIMATE	370	MOD	WT 2016			X
CLIMATE	380	MOD	WT 2016			X
CLIMATE	381	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	X
CLIMATE	401	MOD	WT 2016			X
CLIMATE	405	MOD	WT 2016			X
CLIMATE	410	MOD	WT 2016			X
CLIMATE	411	MOD	WT 2016			X
CLIMATE	414	MOD	WT 2016			X
CLIMATE	422	MOD	WT 2016			X
CLIMATE	440	MOD	WT 2016			X
CLIMATE	441	MOD	WT 2016			X
CLIMATE	442	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	X
CLIMATE	451	MOD	WT 2016			X
CLIMATE	462	MOD	WT 2016			X
CLIMATE	466	MOD	WT 2016			X
CLIMATE	467	MOD	WT 2016			X
CLIMATE	474	MOD	WT 2016			X
CLIMATE	475	MOD	WT 2016			X
CLIMATE	476	MOD	WT 2016			X
CLIMATE	478	MOD	WT 2016			X
CLIMATE	480	MOD	WT 2016			X
CLIMATE	498	MOD	WT 2016			X
CLIMATE	499	MOD	WT 2016		Directed study not to be cross-listed. Original form submitted. Did not receive an updated form. Currently, this	X

					form has directed study cross-listed.	
CLIMATE	501	MOD	WT 2016			X
CLIMATE	524	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	X
CLIMATE	551	MOD	WT 2016			X
CLIMATE	563	MOD	WT 2016			X
CLIMATE	564	MOD	WT 2016			X
CLIMATE	575	MOD	WT 2016			X
CLIMATE	576	MOD	WT 2016			X
CLIMATE	578	MOD	WT 2016			X
CLIMATE	591	MOD	WT 2016			X
CLIMATE	592	MOD	WT 2016			X
CLIMATE	605	MOD	WT 2016			X
CLIMATE	606	MOD	WT 2016			X
CLIMATE	651	MOD	WT 2016		Advised? Enforced?	X
CLIMATE	747	MOD	WT 2016			X
CLIMATE	749	MOD	WT 2016			X
SPACE	101	MOD	WT 2016			X
SPACE	204	MOD	WT 2016			X
SPACE	477	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	X
SPACE	495	MOD	WT 2016			X
SPACE	499	MOD	WT 2016			X
SPACE	574	MOD	WT 2016		Signed version received not yet signed by AERO	X
SPACE	583	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	X
SPACE	598	MOD	WT 2016			X



**MEMORANDUM**

**TO:** COE Curriculum Committee

**FROM:** John Laird *J. Laird*  
Chair, CSE Graduate Committee

**SUBJECT:** Evaluation and approval of change in SUGS in Computer Science and Engineering (CSE).

**DATE:** December 8, 2015

This request is for a modification to the SUGS program .

We intend to broaden the deadline options to allow application during the regular masters timeline. This will give prospective students that didn't previously consider graduate school more flexibility. This was unanimously approved by the CSE Faculty.

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Thank you for your consideration.

# SUGS Program in Computer Science and Engineering

## DRAFT 2016

The five year (to five and a half year) Sequential Undergraduate/Graduate Study (SUGS, “formerly SGUS”) program in the Computer Science and Engineering Program combines undergraduate study in an approved field with graduate study in the CSE Graduate Program.

Undergraduate programs in Computer Science, Computer Engineering, Computer Science in Engineering, Electrical Engineering, Data Science, and those with a minor in Computer Science are eligible for application to a SUGS program in Computer Science and Engineering.

MS/MSE Computer Science and Engineering / BS/BSE in Computer Science  
MS/MSE Computer Science and Engineering / BS/BSE in Computer Science in Engineering  
MS/MSE Computer Science and Engineering / BS/BSE in Computer Engineering  
MS/MSE Computer Science and Engineering / BS/BSE in Electrical and Computer Engineering or  
MS/MSE Computer Science and Engineering / BS in Data Science  
or a MS/MSE Computer Science and Engineering / BS/BSE with a Minor in Computer Science

This Sequential Undergraduate/ Graduate Study (SUGS) program allows students to complete requirements for both degrees in five (to five and a half) years. Many students who enroll in this program plan to enter industry but seek additional intellectual depth beyond the bachelor’s degree. Students who plan to pursue a PhD should apply directly to the CSE PhD program.

### Application Information:

**1. To apply mid-senior year for admission to the graduate program without overlap: Students may apply by the regular master’s deadlines for admission. The application is reviewed and a decision made during the regular application timeline. Application/admission at this time does not give you the advance notice to plan courses given below for juniors-early admission. All other application requirements and pre-requisites are the same for both application paths.**

Fill out and submit the on-line Rackham application within the regular MS application deadlines. Upload all of the following:

- a. Three letters of recommendation
- b. A personal statement
- c. A statement of purpose
- d. An unofficial copy of your transcript
- e. Completed plan of study (include courses that you would like to use for double counting. This will need to be reviewed and updated upon admission and after as needed.)

**2. To apply mid-junior year for early admission. Students must apply for admission no later than the second term of their junior year (and have 80+ hours the term they begin the program). This allows the student additional opportunity to plan his/her courses and to have an early decision for the master’s degree program.**

The application is a two-step process:

**Step One:** Provisional admission (applying by the junior year deadlines).

- a. Fill out and return the CSE admission form for SUGS, available in the CSE Graduate Office. (do not apply online at this time.) Submit all of the following:
- b. Three letters of recommendation
- c. A personal statement
- d. A statement of purpose
- e. An unofficial copy of your transcript

**Step Two:** If provisionally admitted, the student will need to fill out the Rackham online application and submit it at the beginning of the last term of undergraduate coursework. This will initiate the student's recorded "official" admission into the Rackham Graduate School and the CSE Graduate Program. The student will also need to provide a copy of their final undergraduate audit.

Upon provisional admission, the student will meet with the CSE SUGS Student Advisor each term. The purpose of this meeting is to outline a preliminary course of study enabling the student to make appropriate course selections while satisfying undergraduate requirements. The student will need to update a SUGS masters plan of study when necessary.

Admission to the SUGS program for a master's degree is decided by the CSE Graduate Admissions Committee and the Rackham Graduate School. Admission consideration for this program is competitive and not guaranteed.

To begin SUGS in the Fall term, the deadline is the previous January 15

To begin SUGS in the Winter term the deadline is the previous October 1

**Pre-requisite Requirements for both application paths** (you must meet these requirement to be eligible to apply):

Students must have a minimum cumulative GPA of at least 3.6 at the time of the CSE application submission and must maintain that GPA through the undergraduate degree completion.

All applicants must have completed (EECS 281 or EECS 382) AND (EECS 270 or EECS 370), with a grade of B+ or better by the application deadline.

GRE (General) scores are not required, but will be considered if provided. GRE scores are required for admission to the regular CSE MS/MSE and PhD programs. If a student is seriously considering pursuing a PhD, the GRE test should be taken during the senior year. This also facilitates applications for major national graduate fellowships from the National Science Foundation, etc.

#### **Degree Information:**

1. All credit hour and course requirements of the BS/BSE degree must be met. Students with dual major/dual degree undergraduate degrees are not eligible for SUGS
2. All 30 credit hours and all course requirements of Computer Science and Engineering MS/MSE degree must be met.
3. SUGS students must enroll in Rackham for at least two full terms, paying Rackham tuition.
4. Up to nine hours of prior-approved coursework may be double-counted toward each of the two degrees. Courses may not be split for the double count or for transfer. Double-counted hours may *not* include any core courses required for the BS/BSE degree, but may include courses elected to meet technical or general electives required for the BS/BSE degree.

All double-counted hours must be acceptable for Rackham and Graduate Program credit (non-core CSE/EECS 4xx or CSE/EECS 5xx or CSE/EECS 6xx courses, or courses in other departments at the Rackham graduate level). Rackham approved courses are online at [https://secure.rackham.umich.edu/academic\\_information/programs/](https://secure.rackham.umich.edu/academic_information/programs/)

#### **Comments:**

1. Student must meet all Rackham requirements for the SUGS degree. Please refer to their information regarding their rules.
2. A maximum of 15 credit hours may be double counted or transferred for graduate credit, including a maximum of 9 credit hours double counted towards each of the two degrees and a maximum of 6 credit hours transferred from the undergraduate to graduate record. Courses cannot be split. Credit transferred could not be double counted towards the credits needed for the BS/BSE.
3. Each degree may be awarded upon completion of requirements for that degree. You should graduate with your BS(E) degree at the end of the term in which your degree requirements are met. You must complete the BS(E) degree prior to enrollment in the SUGS Masters Program.

#### **CONTACTS:**

CSE Graduate Programs Office, 3909 Beyster Bldg. [csegrad@eecs.umich.edu](mailto:csegrad@eecs.umich.edu)  
December 2015

## **Program in Global Health Design (PGHD)**

The Program in Global Health Design (PGHD) is an academic program that allows undergraduate students to earn the following notation on their transcript: “Program in Global Health Design”. The program can be completed without exceeding the 128 credits required for a BS/BSE/BA and provides students the opportunity to organize their elective courses around a global health design theme. Students from all disciplines are invited to complete the program.

### **Mission Statement**

The Program in Global Health Design aims to provide students from all disciplines with an opportunity to integrate immersive global health experiences and informed design work addressing global health challenges into their curriculum at an undergraduate level.

### **Curriculum**

To complete the Program in Global Health Design, students must declare the program and complete all of the requirements. Declaring the program does not guarantee notation on a student’s transcript. There are four main components to the program:

1. Design course with global health project (Foundations Course)
  - Students must complete a design course in which they work on a project that falls within the theme of global health. The course should expose students to problem definition, concept generation, analysis, prototyping, and evaluation.
2. Supporting Design Course
  - Students must complete one course from the list of approved courses to deepen their understanding of and experience in design.
  - This course can, but is not required to be, a project-based design course.
3. Breadth Course
  - The breadth course should complement students’ knowledge of global health, outside of a design context. Courses in general global health or specific to the thematic area of a student’s design course project are acceptable to fulfill this requirement. This requirement must be fulfilled by completing a course outside of the College of Engineering.

### **Course Breakdown**

<b>Requirement</b>	<b>Credits</b>
Design course	3
Cornerstone class	3
Supporting coursework	3
<b>Total</b>	<b>9</b>

### **How to declare Program in Global Health Design**

To declare PGHD, send an email to [globalhealthdesign@umich.edu](mailto:globalhealthdesign@umich.edu) with the subject ‘Declaring PGHD’ and include in the body your name, UMID number, and any questions/comments you may have.

\*\*\*If you are petitioning to use an alternate course to fulfill any of the requirements (i.e., a course not listed on the approved list) email the course syllabus and a brief paragraph of why you feel the course is an acceptable alternate to fulfill the select requirement to [globalhealthdesign@umich.edu](mailto:globalhealthdesign@umich.edu).

## Advising and Oversight

Program Director: Professor Kathleen Sienko; [sienko@umich.edu](mailto:sienko@umich.edu)

Program Advisor: Maria Young; [mariary@umich.edu](mailto:mariary@umich.edu)

### Course Lists

Note: Students may petition for alternate classes to fulfill the 'supporting design course' and 'breadth course' requirements. These petitions will be approved on a case-by-case basis. Students should gain approval before enrolling in the course as approval of alternate courses is not guaranteed. See 'Declaring PGHD' for instructions on how to petition for an alternate course.

#### Approved Design Course with a global health project List

Note: This is not an exhaustive list and multiple other courses may allow students the opportunity to work on a global health project that would fulfill this requirement. Additionally, enrollment in the below courses alone does not guarantee fulfillment of this requirement as many projects within these courses do not focus on global health.

MECHENG 450: Capstone Design and Manufacturing (co-listed as ENGR 450)

BME 450: Senior capstone design

ME455: Analytic Product Design

ARTDES 342.1: Responsible Design

ENGR 100, Section 200: Design in the Real World

ENGR 100, Section 350: Global Water Issues

#### Approved Supporting Design Course List

BIOMEDE 350: Introduction to Biomedical Design

ENGR 355: Intermediate Multidisciplinary Engineering Project

ENGR 455: Advanced Multidisciplinary Engineering Project

ME 589: Sustainable Design of Technology Systems

ME499/599: Front End Design

SI 422: Needs Assessment and Usability Evaluation

SI 512: Designing for Engagement

SI 582: Introduction to Interaction Design

#### Approved Breadth Course List

AAS 409: Maternal/Child Health & Environmental Pollution in Africa

AAS365/WOMENSTD365: Global Perspectives on Gender, Health, & Reproduction

ANTHRCUL 325/ WOMENSTD 324: Childbirth & Culture

ANTHRCUL 327: Critical Theory in Medicine and Health  
 ANTHRCUL 344: Medical Anthropology  
 ANTHRCUL212: The Global HIV/AIDS Epidemic  
 ANTHRCUL258: Culture & Medicine  
 ANTHRCUL408: Maternal/Child Health & Environmental Pollution in Africa  
 BIOLOGY 118: AIDS and Other Health Crises, Health, and Reproduction  
 ECON 428: Economics of Health Services  
 HBEHED 516: Global Health Anthropological Perspectives  
 HISTORY 284: Sickness and Health in Society: 1492-Present  
 HISTORY 300: Epidemics Throughout History  
 HISTORY 302: History of Global Health  
 HISTORY 355/ AAS 355: Health & Illness in African Worlds  
 HISTORY 620: Studies in Modern Medicine and Health  
 INTMED 387: Implementation solutions for global health equity  
 PUBHLTH 350: Global Public Health; Challenges and Transformations  
 RCIDIV 370: Western and Non-Western Medicine  
 RCSSCI 275: Social Dynamics of Science, Technology, and Medicine  
 SOC 205: Poverty, Race, and Health  
 SOC 475: Introduction to Medical Sociology  
 SOC 476: Sociology of Bioethics  
 SOC 571: Race, Ethnicity, and Health  
 STRAT 562/TO 563: Innovation in Global Health Delivery  
 WOMENSTD 112: Issues in Gender and Health  
 WOMENSTD 220: Perspectives in Women's Health

## **Program in Socially Engaged Design (PSED)**

The Program in Socially Engaged Design is an academic program that allows undergraduate engineering students to focus on techniques of socially engaged design and earn the following notation on their transcript: “Program in Socially Engaged Design”. The program can be completed without exceeding the 128 credits required for a BS/BSE and provides students the opportunity to organize their elective courses around the theme of socially engaged design. Students from all disciplines are invited to complete the program.

### **Background: Socially Engaged Design**

Socially Engaged Design (SED) applies traditionally non-engineering skills and knowledge to the integration of social, cultural, economic, and environmental context in technology design processes. SED extends beyond user-centered and human-centered design to bring a richer context into the design process and impact the effectiveness of design activities.<sup>1</sup> The need for socially engaged design follows from a disconnect between technology designers and the needs and wants of individuals, communities, and societies that are the intended targets for technology adoption.<sup>2,3</sup> SED techniques can be applied to the design of products, processes, systems, and services, both within high-income country and low- and middle-income country settings.

The Center for Socially Engaged Design (Insitu) is launching a new educational opportunity for students to learn techniques and skills of SED, topics that are currently lacking in the standard engineering curriculum at UM. The Socially Engaged Design Academy (SEDA) will consist of learning blocks that leverage on-demand online learning as well as asynchronous face-to-face hands-on skills training to allow students to gain skills in numerous topic areas within the SED space. In a local interview study conducted at UM, engineering faculty described a need for instructional support to expose their students to these important non-traditional engineering skills. SEDA will serve as a resource for both students and faculty to use, so that they may engage in socially engaged design work with a solid background and understanding. Additional information about SEDA is located at the end of this document.

### **Mission Statement**

The Program in Socially Engaged Design (PSED) provides students with an opportunity to focus their undergraduate degree and develop key skills in socially engaged design.

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<sup>1</sup> Duderstadt, J. J. (2010). Engineering for a changing world. In *Holistic Engineering Education* (pp. 17-35). Springer New York.

<sup>2</sup> Lawson, C. (2011). DEED: A Case Study for Meaningful and Socially-Engaged Design Education. Cumulus Paris 2011 Conference.

<sup>3</sup> Sheppard, S. D., Macatangay, K., Colby, A., & Sullivan, W. M. (2008). Educating Engineers: Designing for the Future of the Field. Book Highlights. *Carnegie Foundation for the Advancement of Teaching*.

## Curriculum

To complete the Program in Socially Engaged Design, students must declare the program and complete all of the requirements. Declaring to the program does not guarantee notation on a student's transcript. There are four requirements to ensure program completion:

1. Foundations Course (3 credits)
  - ME499/599 – Front End Design with Prof. Shanna Daly.
  - All students must complete this course; no substitutions will be accepted.
2. Supporting Design Course (3 credits)
  - Students must complete one course from the list of approved courses to deepen their education of socially engaged design practices.
3. Breadth Course (3 credits)
  - Students must complete one course from the list of approved courses to broaden a student's education outside of the College of Engineering.
  - Students are encouraged to choose a course in the thematic area of a design project they are engaging in at the curricular or co-curricular level.
4. SEDA Learning Blocks (For completion – not credit bearing)
  - Students must complete two Socially Engaged Design Academy (SEDA) learning blocks from the list of approved learning blocks.
  - SEDA blocks will serve to round out a student's SED knowledge and skills, by providing instruction and assessment on topics that are currently not covered or are covered in a limited manner at a curricular level within the CoE, i.e., there is no stand alone SED course and therefore it is unlikely that a student will be able to engage with a broad spectrum of SED topic areas in their coursework alone.

## Credit Breakdown

Requirement	Credits
Foundations Course (ME499)	3
Supporting Coursework in SED	3
Cornerstone Coursework	3
Insitu blocks	n/a
Total	9

## How to declare PSED

To declare PSED, send an email to [sociallyengageddesign@umich.edu](mailto:sociallyengageddesign@umich.edu) with the subject 'Declaring PSED' and include in the body your name, UMID number, and any questions/comments you may have.

\*\*\*If you are petitioning to use an alternate course to fulfill any of the requirements (i.e., a course not listed on the approved list) separately email the course syllabus and a brief paragraph of why you feel the course is an acceptable alternate to fulfill the select requirement to [sociallyengageddesign@umich.edu](mailto:sociallyengageddesign@umich.edu).

## Advising and Oversight

Program Directors: Professor Shanna Daly ([srdaly@umich.edu](mailto:srdaly@umich.edu)), Professor Kathleen Sienko ([sienko@umich.edu](mailto:sienko@umich.edu)), Professor Steve Skerlos ([skerlos@umich.edu](mailto:skerlos@umich.edu)). One faculty member will be identified as the primary point of contact each academic year.

Program Advisor: Maria Young ( [mariary@umich.edu](mailto:mariary@umich.edu) )

#### Approved Course Lists

Note: Students may petition for alternate classes to fulfill the 'supporting design course' and 'breadth course' requirements. These petitions will be approved on a case-by-case basis. Students should gain approval before enrolling in the course as approval of alternate courses is not guaranteed.

#### Approved Supporting Design Course Requirement List

ENGR 355: Intermediate Multidisciplinary Engineering Project

ME 455: Advanced Multidisciplinary Design Project

ME 589: Sustainable Design of Technology Systems

NRE 550: Systems Thinking for Sustainable Development

SI 512: Designing for Engagement

ARTDES 610: Directed Studio Practice

ME 581: Global Product Development

SI 422: Needs Assessment and Usability Evaluation

CEE 265: Sustainable Engineering Principles

SI 582: Introduction to Interaction Design

#### Approved Breadth Course Requirement List

AOSS 530: Engineering Climate Change

ARCH 509: Design Activism and Social Change

INTMED 387: Implementation solutions for global health equity (for a student working on a global health project)

ENVIRON 304 Topics in Culture and Environment (for a student working on an environmental project)

ANTHRCUL 256: Culture, Adaptation, and Environment

HISTART354: Art, Science, and Technology

STRAT 562/TO 563: Strategies for Enhancing Growth and Improving Access in Emerging Markets

NRE 514: Environmental Impact Assessment

NRE 560: Behavior and Environment

SI 648/748: Infoculture: Theory and Methods in the History and Sociology of Info Technology

#### Approved SEDA Learning Block Topics (names subject to change):

Community engagement

Cultural awareness

Social and personal identities

Communication

Reflection

## Additional information about SEDA

Our learning block model uses instructional aides, graduate or advanced undergraduate students trained in socially engaged design by the research team, to support students in moving through five parts: 1) Prior Knowledge Review, 2) Core Content, 3) Knowledge Check, 4) Application, and 5) Reflection. These are illustrated in Figure 1 below.

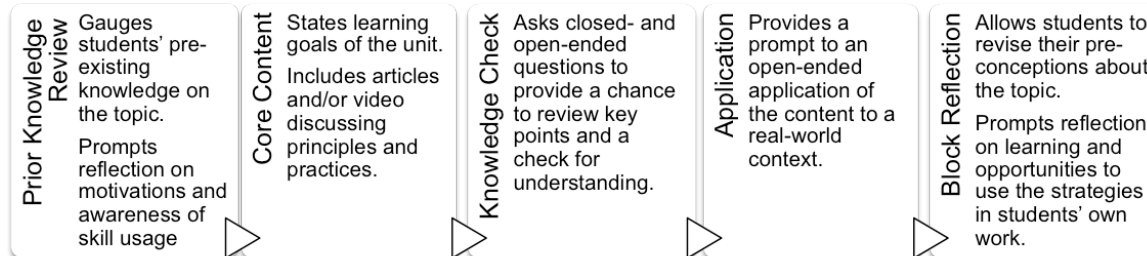


Figure 1. Learning Block Model and Goals

**Prior Knowledge Review:** The prior knowledge review includes 1-2 questions that gauge students' pre-existing ideas about the topic. It is important for students to acknowledge and be aware of existing conceptions about a topic before they dive into study (Gilbert & Watts, 1983; Smith III, Disessa, & Roschelle, 1994; Wiggins & McTighe, 1993). This provides a foundation for which students can integrate new knowledge and challenge prior conceptions. The prior knowledge review also prompts students to describe their motivations for learning about the topic. Student recognition of internal motivations can prompt more effort in the learning block (Wigfield & Eccles, 2000). For example, in the interview block, prior knowledge questions could be: "What are the best practices in developing interview questions?" and "In what design contexts would one use stakeholder interviewing?" Answering these questions requires that students consider what they already know, makes the conception conscious as they move through the learning activities in the block, and has them identify how the content could apply to their own current and future work.

**Core Content:** In this section, students are provided with the learning goals of the unit written in a way that describes what they will be able to do upon completing the unit, which is in alignment with best practices in writing learning goals (Wiggins & McTighe, 2005). These learning goals provide direction for students' focus as they read and review video material about the topic allowing them to hone in on key concepts as they move through the block (Angelo & Cross, 1993; Murray, 1985; Wiggins & McTighe, 2005). The core content for the block is then provided through a synthesis of excerpts from videos, articles, book chapters, and websites. The core content is focused on foundational skills and knowledge of the topic and includes multiple real-world examples of the use of the content. Demonstrating how concepts relate to real-life situations is a frequently recommended strategy in engineering education as it increases student engagement, motivation, and ability to transfer learned knowledge to other contexts (Felder, Woods, Stice, & Rugarcia, 2000; Sheppard, Johnson, & Johnson, 2005; Tobias, 1990).

**Knowledge Check:** The knowledge check section is comprised of both closed-ended and open-ended questions. The questions have been designed to assess students' understanding of the core content. It is an opportunity for students to get formative feedback for themselves on their understandings, which is in alignment with best practices in teaching and learning (Angelo & Cross, 1993; Hershock & O'Neal, 2008). The collection of questions will address multiple levels of Bloom's taxonomy (Krathwohl, 2002), moving beyond the recall level to necessitate a deep understanding and analysis (Sosniak, 1994). For example, in the interview block, we would ask students to evaluate and select from a series of interview questions based on best practices,

and to analyze and compare different options for follow-up questions based on stakeholder responses. The combination of closed- and open-ended questions supports this variety, allowing for a balance in question type. The closed-ended questions can be auto-graded, and the open-ended ones allow for personalized feedback to be sent from an instructional aide, who bases feedback on a developed rubric and experience and training in socially engaged design.

Application: In this section, students must transfer the knowledge and skills they learned to a new context by constructing, designing, or developing a plan or approach (the highest level of Bloom's taxonomy (Krathwohl, 2002)). The context with which students are presented is intended to emulate real-life socially-engaged design scenarios, allowing students to see how their knowledge translates to work they will do as engineers (Pintrich & Zusho, 2002; Tobias, 1990; Sosniak, 1994; Wigfield & Eccles, 2000). For example, the interview block will give students some background on a design scenario and ask them to develop an interview protocol they would use to talk to specific stakeholder. The observation block will ask students to come up with a structure to collect observations and use this structure for an observation session they will complete using a video of an activity in a culture. Students submit their application task, and schedule an in-person meeting with an instructional aide, who is an advanced undergraduate student or graduate student with prior experience in socially-engaged design and trained by us to use the rubrics to give feedback. The instructional aide discusses strengths and weaknesses in the student's work, and answers any additional questions about the task or the broader topic. A rubric, which guides the instructor through aspects they will discuss with a student on a given task, will serve as a tool for both the student and the instructional aide to know that the student has demonstrated competency in this skill. As quality of interactions with instructors has been shown to be a key factor in college students' academic development (Sheppard, Johnson, & Johnson, 2005), the integration of a face-to-face meeting (or a skype-to-skype meeting, if long distance) into the asynchronous format is an important component of our learning block model. Upon receiving feedback, students iterate on their application task based on the feedback and submit a final version. Iteration based on feedback is important in students' development of a deeper understanding of the material (Angelo & Cross, 1993).

Reflection: The learning block concludes with a reflection section where students are asked to review and update their prior conceptions and consider applications of what they learned. These questions are intended to support meta-level thinking, allowing students to analyze how they think about the topic and its use. Reflection enhances critical thinking, teamwork, professional skills, and professional practices (Schön, 1995; Finger et al., 2006; Hirsch and McKenna, 2008). The same questions students responded to in the prior knowledge review will be presented along with students' original responses; students will be asked to consider how their ideas have changed and/or developed. They will also be asked questions related to their initial motivations for learning the skills and how they expect to apply the skills in their future work.

**THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING**  
**Course Approval Request**  
 College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2692**

Date **10/19/2015**

**Action Requested**

- ☐ New Course  
☐ Modification of Existing Course  
☒ Deletion of Course

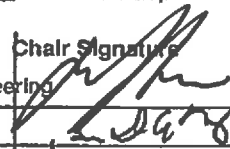
**Complete the following sections:**  
 New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

**A. CURRENT LISTING**

**B. REQUESTED LISTING**

Home Department <b>CHE Chemical Engineering</b>		Course Number <b>530</b>		Home Department		Course Number	
Cross Listed Course Information <b>Bioinformatics</b>				Cross Listed Course Information <b>530</b>			
Course Title <b>Bioinformatics and Gene Expression - Data Warehousing and Data Mining Perspectives</b>				Course Title <b>Introduction to Bioinformatics, Systems Biology and Predictive Modeling</b>			
TITLE ABBREVIATION		Time Sched Max = 19 Spaces Transcript Max = 20 Spaces		TITLE ABBREVIATION		Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	
		<b>BIOINFO &amp; GENE EXP DW</b>					
		<b>Bioinfo &amp; Gene Exp DW</b>					
Course Description <b>This course is designed for students interested in learning basics of the rich data emanating from recent genomic and high throughput expression technologies. Introductory background on molecular biology, algorithms, and expression technologies will be covered. The focus of this course will be relating gene expression data to biological functions drug discovery. Issues in building enterprise data warehouse and data mining tools will also be discussed.</b>				Course Description for Official Publication (Max = 50 words)			
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Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
Approval Info <input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2				Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept. Department Chair Name <b>Mark Burns, Chemical Engineering</b> <b>Brian Athey, Bioinformatics</b>			
Approved by Name _____				Chair Signature 			
Approved Date _____				Home Dept. _____			
				Cross-listed _____			

Dept(s).

Form Number

2692

## SUPPORTING STATEMENT

Request is to delete this course. It has not been offered since 2004.

This class was taught in the past on:

Fall 2002 - Chester, NJ

Fall 2003 - Chester, NJ

Fall 2004 - Chester, NJ

Dr. Ni was a scientist at Pfizer at the time.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

**THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING**  
**Course Approval Request**

College Curriculum Committee, 1420 Lurie Engineering Center Building

**Form Number**

**2533**

**Action Requested**

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

**Complete the following sections:**

New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

**Date** **12/01/2015**

**Effective Term** **Fall 2016**

**Course Offer Freq** ☒ Indefinitely  
☐ One term only

**A. CURRENT LISTING**

**B. REQUESTED LISTING**

<p>Home Department _____ Course Number _____</p> <p><input type="checkbox"/> Cross Listed Course Information</p> <p><input type="checkbox"/> Course Title</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">TITLE</td> <td style="width:15%;">Time Sched Max = 19 Spaces</td> <td style="width:70%;"></td> </tr> <tr> <td>ABBREVIATION</td> <td>Transcript Max = 20 Spaces</td> <td></td> </tr> </table> <p><input type="checkbox"/> Course Description</p> <p><b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j</p> <p><b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Tech Elective  <input type="radio"/> Core Course <input type="radio"/> Other  <input type="radio"/> Free Elective</p> <p>Prereq <input checked="" type="radio"/> Enforced <input type="radio"/> Advised</p> <p>Credit Restrictions</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;"><b>Level of Credit</b></td> <td style="width:20%;">Credit Hours Min Max</td> <td style="width:20%;">Contact Hrs/Wk</td> <td style="width:30%;"></td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad                 </td> <td> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/add'l Work                 </td> <td></td> <td></td> </tr> </table>	TITLE	Time Sched Max = 19 Spaces		ABBREVIATION	Transcript Max = 20 Spaces		<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work			<p>Home Department _____ Course Number <b>280</b></p> <p>Cross Listed Course Information</p> <p>Course Title  <b>Programming and Introductory Data Structures</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">TITLE</td> <td style="width:15%;">Time Sched Max = 19 Spaces</td> <td style="width:70%;">Prog &amp; Data Struc</td> </tr> <tr> <td>ABBREVIATION</td> <td>Transcript Max = 20 Spaces</td> <td>Prog Data Str</td> </tr> </table> <p>Course Description for Official Publication (Max = 50 words)              Techniques and algorithm development and effective programming, top-down analysis, structured programming, testing, and program correctness. Program language syntax and static and runtime semantics. Scope, procedure instantiation, recursion, abstract data types, and parameter passing methods. Structured data types, pointers, linked data structures, stacks, queues, arrays, records, and trees.</p> <p><b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j</p> <p><b>Degree Requirements</b> <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Tech Elective  <input type="radio"/> Core Course <input type="radio"/> Other  <input type="radio"/> Free Elective</p> <p>Prereq <b>EECS 182 or EECS 183 or ENGR 101 or ENGR 151 ;</b>  <input checked="" type="radio"/> Enforced (C or better) or equivalent or permission of instructor  <input type="radio"/> Advised</p> <p>Credit Restrictions <b>[Fewer than 2 previous elections of EECS 280 (incl. grades of W &amp; I)] and [No credit in EECS 280; (C or better)]</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;"><b>Level of Credit</b></td> <td style="width:20%;">Credit Hours Min Max</td> <td style="width:20%;">Contact Hrs/Wk</td> <td style="width:30%;"></td> </tr> <tr> <td> <input checked="" type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad                 </td> <td> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/add'l Work                 </td> <td></td> <td>                     4                      4                      14                 </td> </tr> </table>	TITLE	Time Sched Max = 19 Spaces	Prog & Data Struc	ABBREVIATION	Transcript Max = 20 Spaces	Prog Data Str	<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk		<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		4 4 14
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Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? ☐ Yes ☒ No Max Hours? \_\_\_\_\_ Max Times? \_\_\_\_\_ Can it be repeated in the same term? ☐ Yes ☒ No

<p><b>Class Type(s)</b>  <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____  <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind</p> <p><b>Graded Section</b>  <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____  <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind</p> <p align="center">Course Is Y Graded <input type="checkbox"/></p>	<p><b>Grading</b>  <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U</p> <p><b>Location</b>  <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension</p>	<p><b>Cognizant Faculty Member:</b> _____ Title _____                  Georg Essl Asst Prof                  Jeff Ringenberg Lec IV</p> <p>Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty</p>
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<b>Approval Info</b> <input checked="" type="checkbox"/> Curriculum Comm.	<b>Approved by Name</b> _____	<b>Approved Date</b> _____	<b>Submitted By:</b> <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2	_____	_____	<b>Department</b> _____ <b>Chair Name</b> _____	<b>Chair Signature</b> _____
	_____	_____	Home Dept. _____	
	_____	_____	Cross-listed _____	

2533

EECS 280 instructors have been using a lab style format in discussion sections for the the last two years and have found it to be a much better way to teach programming than a discussion format. Students bring their laptops to class. They receive a worksheet of programming exercises that are preparatory to the next project assignment. Instructors and GSIs help students with problems they may encounter. There are several advantages to this approach. Some students (especially those who have not programmed before) have a difficult time knowing how to begin a programming project. In a lab they learn the correct way to design and develop programs. A very common mistake among beginning programmers is that they write an entire program for the project and then have no idea how to debug when it does not work. In lab sections, they learn to develop incrementally, testing each part along the way.

Based on the success of this approach, CSE has decided to replace one-hour discussions in EECS 280 and 281 with two-hour labs. Instructors and GSIs will have an additional contact hour with students, but we anticipate that there will be fewer office hours where GSIs pore over miserably written programs that students have no idea how to debug.

ENGR 101 has had labs rather than discussions programming courses for many years, so this is not a precedent in the College.

Most students in EECS 280 own laptops. (The cost of a laptop is not much more than the cost of some textbooks now.) CSE has provided loaners through its Department Computing Organization to those few students (around 5 per semester) who do not own laptops. We are confident that we will be able to handle the small number of students in this situation.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

### Detail the Special requirements

[illegible]

**THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING**  
**Course Approval Request**

College Curriculum Committee, 1420 Lurie Engineering Center Building

**Form Number**

**2736**

**Action Requested**

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

**Complete the following sections:**

New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

**Date** **12/1/2015**

**Effective Term** **Fall 2016**

**Course Offer Freq**

- ☒ Indefinitely  
☐ One term only

**A. CURRENT LISTING**

**B. REQUESTED LISTING**

<div style="display: flex; justify-content: space-between;"> <span>Home Department</span> <span>Course Number</span> </div>	<div style="display: flex; justify-content: space-between;"> <span>Home Department</span> <span>Course Number</span> </div>												
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**THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING**  
**Course Approval Request**

Form Number

2738

College Curriculum Committee, 1420 Lurie Engineering Center Building

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

**Complete the following sections:**

New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

Date **12/2/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

**A. CURRENT LISTING**

**B. REQUESTED LISTING**

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The description reflects changes occurring in the field since old description was written.

### Detail the Special requirements

PAGE 25

**THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING**  
**Course Approval Request**  
 College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number

2749

Date 12/16/2015

**Action Requested**

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

**Complete the following sections:**


New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

**A. CURRENT LISTING**

**B. REQUESTED LISTING**

Home Department		Course Number		Home Department		Course Number	
				NAVARCH Naval Arch & Marine Engin		280	
<input type="checkbox"/> Cross Listed Course Information				<input type="checkbox"/> Cross Listed Course Information			
<input type="checkbox"/> Course Title				<input type="checkbox"/> Course Title			
				Introduction to Probability for Marine Engineers			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces			TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Prob Marine Eng	
	Transcript Max = 20 Spaces				Transcript Max = 20 Spaces	Prob Marine Eng	
<input type="checkbox"/> Course Description				<input type="checkbox"/> Course Description for Official Publication (Max = 50 words)			
				Introduction to the fundamentals of probability theory, with marine applications. Events, Probabilities, Combinatorics, Independence, Bayes Theorem; Discrete and Continuous Random Variables, Central Limit Theorem, Elements of Engineering Statistics, goodness of fit, regression, correlation.			
<b>PROGRAM OUTCOMES:</b>		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<b>PROGRAM OUTCOMES:</b>		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
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<input type="checkbox"/> Faculty						<b>Department Chair Name</b>	
<input type="checkbox"/> Cross listed Unit 1						Naval Arch & Marine Engin	
<input type="checkbox"/> Cross listed Unit 2						<b>Chair Signature</b>	
							

**SUPPORTING STATEMENT**

Enforced prerequisites inadvertently excluded transfer students. Please change to advisory.....

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

## Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

## Complete the following sections:

New Courses - B & C completely  
 Modifications - A modified information, B & C completely  
 Deletions - A & C completely

Date **12/16/2015**Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

## A. CURRENT LISTING

## B. REQUESTED LISTING

Home Department		Course Number	Home Department		Course Number
NAVARCH Naval Arch & Marine Engin		461	NAVARCH Naval Arch & Marine Engin		461
Cross Listed Course Information			Cross Listed Course Information		
			MFG Manufacturing		462
Course Title			Course Title		
			Marine Structures Construction		
TITLE	Time Sched		TITLE	Time Sched	
ABBRE-	Max = 19 Spaces		ABBRE-	Max = 19 Spaces	MarStructureConst
VIATION	Transcript		VIATION	Transcript	MarStructureConst
	Max = 20 Spaces			Max = 20 Spaces	
Course Description			Course Description for Official Publication (Max = 50 words)		
			Principles and applications of modular construction and assembly, major manufacturing processes, thermo-mechanical interactions and contributions to quality and dimensional accuracy, accuracy control methods and practices.		

<b>PROGRAM OUTCOMES:</b>		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	<b>PROGRAM OUTCOMES:</b>		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j
<b>Degree Requirements</b>		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	<b>Degree Requirements</b>		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input checked="" type="radio"/> Core Course <input type="radio"/> Tech Elective
Prereq NA 260, NA 310			Prereq NA 260, NA 310		
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised			<input type="radio"/> Enforced <input checked="" type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
<b>Level of Credit</b>		Credit Hours	<b>Level of Credit</b>	Credit Hours	Contact Hrs/Wk
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Ugrad or Rckhm Grad	<input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rckhm Grad w/add'l Work	Min Max	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rckhm Grad <input checked="" type="checkbox"/> Ugrad or Rckhm Grad	Min Max	3 3
		Number of Wks			14

Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? ☐ Yes ☐ No Max Hours? \_\_\_\_\_ Max Times? \_\_\_\_\_ Can it be repeated in the same term? ☐ Yes ☐ No

<b>Class Type(s)</b>		<b>Grading</b>	<b>Location</b>	<b>Cognizant Faculty Member:</b>		<b>Title</b>
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Dong		Professor
<b>Graded Section</b>				Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty		
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	Course Is Y Graded <input type="checkbox"/>					
<b>Approval Info</b>		<b>Approved by Name</b>		<b>Approved Date</b>		
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2						
				Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.		
				<b>Department Chair Name</b>		<b>Chair Signature</b>
				Home Dept. Naval Arch & Marine Engin		
				Cross-listed Manufacturing		
				Dept(s).		

**SUPPORTING STATEMENT**

Enforced prerequisites inadvertently excluded transfer students. Please change to advisory.

This course provides a mechanics approach to engineering problem solving by focusing on thermal manufacturing processes (thermal cutting, forming, welding/joining, and assembly). Although with an emphasis on applications on marine structures, the basic principles and problem solving procedures are directly applicable to mass-production environment. Examples used in this course ranging from automotive, aerospace, off-highway vehicles, heavy fabrication, to offshore and ship structure construction.

Therefore, it should be of interest to students interested in manufacturing engineering and related disciplines.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

**List of Courses with ONLY Change to Program Designation and/or Program Designation in a Prereq to Course**

	NEW SUBJECTS	
	CLIMATE	SPACE
AOSS 101 (ASTRO 183). Rocket Science		X
AOSS 102 (EARTH 122) (ENVIRON 102). Extreme Weather	X	
AOSS 103. Intro Space Weather		X
AOSS 105 (CHEM 105) (ENSCEN 105) (ENVIRON 105). Our Changing Atmosphere	X	
AOSS 110. Climate and Space Science and Engineering Seminar	X	X
AOSS 171 (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 110) (EARTH 171). Introduction to Global Change-Part I	X	
AOSS 172 (Univ Course 111) (EARTH 172) (ENSCEN 172) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II	X	
AOSS 204 (ASTRO 204) (EARTH 204). The Planets: Their Geology and Climates		X
AOSS 205. Mathematics of Rocket Science		X
AOSS 300. Global Environment Impact of Technological Change	X	
AOSS 323 (EARTH 323). Earth System Analysis	X	X
AOSS 370 (EARTH 370). Solar Terrestrial Relations		X
AOSS 407. Mathematical Methods in Geophysics	X	X
AOSS 410 (EARTH 409). Earth Modeling	X	
AOSS 411 (EARTH 411). Cloud and Precipitation Processes	X	
AOSS 414 (EARTH 414). Weather Systems	X	X
AOSS 422 (EARTH 423). Boundary Layer Meteorology	X	
AOSS 431 (EECS 430). Radiowave Propagation and Link Design	X	
AOSS 440 (EARTH 454). Meteorological Analysis Laboratory		
AOSS 441. Meteorology and Climate of the Rockies	X	X
AOSS 442 (ENSCEN 442). Oceanic Dynamics I	X	
AOSS 450. Geophysical Electromagnetics	X	X
AOSS 451 (ENSCEN 451) (EARTH 457). Atmospheric Dynamics I	X	
AOSS 462. Instrumentation for Atmospheric and Space Sciences	X	
AOSS 463 (ENSCEN 463). Air Pollution Meteorology	X	
AOSS 466. Carbon-Climate	X	
AOSS 467 (CHEM 467) (EARTH 465) (ENSCEN 467) (Environ 467). Biogeochemical Cycles	X	
AOSS 473. Climate Physics	X	
AOSS 474 (EARTH 474). Ice Sheets, Glaciers and Climate Change	X	
AOSS 475 (ENSCEN 475) (EARTH 475). Earth System Interactions		X
AOSS 476. Ocean Dynamics and Climate	X	X
AOSS 477. Space Weather Modeling	X	
AOSS 478. Engineering for Space Environment	X	
AOSS 479 (ENSCEN 479). Atmospheric Chemistry		X
AOSS 480 (NRE 480). climate Change: The Move to Action	X	X
AOSS 495 (ENSCEN 495). Upper Atmosphere and Ionosphere	X	
AOSS 499. Directed Study for Undergraduate Students	X	
AOSS 511. Aerosol Physics and Chemistry	X	
AOSS 524. General Circulation	X	X
AOSS 530. Using Climate-Change Knowledge in Planning and Design		X
AOSS 532. Radiative Transfer	X	X
AOSS 545. High Energy Density Physics	X	
AOSS 555. Spectral Methods	X	X
AOSS 563 (ENSCEN 563). Air Pollution Dispersion Modeling	X	X
AOSS 564 (ENSCEN 564). The Stratosphere and Mesosphere		X
AOSS 565. Planetary Atmospheres	X	
AOSS 574 (AEROSP 574). Introduction to Space Physics	X	
AOSS 575 (ENSCEN 575). Air Pollution Monitoring	X	
AOSS 576 (ENSCEN 576). air Quality Field PProject	X	
AOSS 578 (EIH 666). Air Pollution Chemistry		X
AOSS 580. Remote Sensing and Geographic Information System Project Laboratory		X
AOSS 581 (AEROSP 581). Space Policy and Management		X
AOSS 582 (AEROSP 582). Spacecraft Technology		X
AOSS 583 (AEROSP 583). Management of Space Systems Design	X	X
AOSS 584. Space Instrumentation	X	
AOSS 585. Introduction to Remote Sensing and Inversion Theory	X	
AOSS 586. Climate Data Analysis	X	
AOSS 587 (EECS 532). Microwave Remote Sensing I: Radiometry	X	
AOSS 588. Regional Scale Climate		X
AOSS 589. The Art of Climate Modeling		X
AOSS 590. Space Systems Projects		X
AOSS 595 (EECS 518). Magnetosphere and Solar Wind		X

AOSS 596. Gaskinetic Theory		X
AOSS 597 (AEROSP 597). Fundamentals of Space Plasma Physics	X	X
AOSS 598. The Sun and Heliosphere		X
AOSS 606. Computer Applications to Geo-Fluid Problems	X	X
AOSS 651. Dynamics of Planetary Atmospheres and the Upper Atmosphere	X	X

#### Courses Where Course Descriptions Are Changing

	NEW SUBJECTS	
	CLIMATE	SPACE
AOSS 280. Undergraduate Research Experience	X	X
AOSS 320 (EARTH 320). Earth System Evolution	X	X
AOSS 381. Undergraduate Research Experience II	X	
AOSS 405. Special Topics	X	
AOSS 498. Practicum in Atmospheric, Oceanic and Space Sciences	X	
AOSS 501. Seminars in Climate, Atmospheres and Space Sciences	X	
AOSS 591. Climate Practicum I	X	X
AOSS 592. Climate Practicum II	X	X
AOSS 605. Current Topics in Atmospheric, Oceanic and Space Sciences	X	X
AOSS 747. AOSS Student Seminar	x	x
AOSS 749. Atmospheric and Space Science Seminar	x	x

#### Courses Where Course Title is Changing

	NEW SUBJECTS	
	CLIMATE	SPACE
AOSS 320 (EARTH 320). Earth System Evolution	X	X
AOSS 321 (EARTH 321). Earth System Dynamics	X	X
AOSS 381. Undergraduate Research Experience II	X	
AOSS 405. Special Topics	X	
AOSS 498. Practicum in Atmospheric, Oceanic and Space Sciences	X	
AOSS 501. Seminars in Climate, Atmospheres and Space Sciences	X	
AOSS 551. Fluid Dynamics for Atmospheric and Space Sciences		
AOSS 591. Climate Practicum I	X	X
AOSS 592. Climate Practicum II	X	X
AOSS 605. Current Topics in Atmospheric, Oceanic and Space Sciences	X	X
AOSS 747. AOSS Student Seminar	x	x
AOSS 749. Atmospheric and Space Science Seminar	x	x

#### Courses Where Course Credits Are Changing

##### 4 Credits to 3 Credits

	NEW SUBJECTS	
	CLIMATE	SPACE
AOSS 320 (EARTH 320). Earth System Evolution	X	X
AOSS 321 (EARTH 321). Earth System Dynamics	X	X
AOSS 350 (EARTH 350). Atmospheric Thermodynamics	X	X
AOSS 380 (EARTH 381). Introduction to Atmospheric Radiation	X	X
AOSS 401 (EARTH 401). Geophysical Fluid Dynamics	X	

#### Courses Where Both Course Description and Course Credits Are Changing

	NEW SUBJECTS	
	CLIMATE	SPACE
AOSS 320 (EARTH 320). Earth System Evolution	X	X
AOSS 321 (EARTH 321). Earth System Dynamics	X	X

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2632

Date 8/5/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	102	CLIMATE Climate & Meteorology	102
Cross Listed Course Information		Cross Listed Course Information	
GEOSCI	122	EARTH	122
ENVIRON	102	ENVIRON	102
Course Title		Course Title	
Extreme Weather		Extreme Weather	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces
Transcript Max = 20 Spaces	Extreme Weather	Transcript Max = 20 Spaces	Extreme Weather
Course Description		Course Description for Official Publication (Max = 50 words)	
This course provides an introduction to the physics of extreme weather events. The course uses examples of the thunderstorms, jet stream, floods, lake-effect snowstorms, lightning, thunder, hail, hurricanes, and tornados to illustrate the physical laws governing the atmosphere. Participants apply these principles in hands-on storm forecasting and weather analysis assignments.			
PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k
Degree Requirements	<input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other	Degree Requirements	<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Core Course <input type="radio"/> Tech Elective <input type="radio"/> Other
Prereq	<input type="radio"/> Enforced <input type="radio"/> Advised	Prereq	<input type="radio"/> Enforced <input type="radio"/> Advised
Credit Restrictions		Credit Restrictions	
Level of Credit	Credit Hours Min Max	Level of Credit	Credit Hours Min Max
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work	<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work
3 3	3 3	3 3	3 3
Contact Hrs/Wk 3	Number of Wks 14	Contact Hrs/Wk 3	Number of Wks 14

Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s) ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading ☒ A-E ☐ CR/NC ☐ P/F ☐ S/U

Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Graded Section ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Cognizant Faculty Member: Title

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info ☐ Curriculum Comm. ☐ Faculty ☐ Cross listed Unit 1 ☐ Cross listed Unit 2

Approved by Name Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name Chair Signature

Home Dept. Climate & Space Mark Moldwn

Cross-listed Dept(s) Earth and Envir Sci

Environmental Sciences & Engin

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

Form Number

2632

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 

2001
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Date 8/5/2015

Effective Term	Winter 2016
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**Course Offer Freq** ☒ Indefinitely  
☐ One term only

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

### B. REQUESTED LISTING

Home Department		Course Number		Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		105		CLIMATE Climate & Meteorology		105	
Cross Listed Course Information				Cross Listed Course Information			
Chemistry		105		Chemistry		105	
ENSCEN		105		ENSCEN Environmental Sciences & Engin		105	
				ENVIRON 105			
Course Title				Course Title			
				Our Changing Atmosphere			
TITLE ABBRE- VIATION		Time Sched Max = 19 Spaces  Transcript Max = 20 Spaces		TITLE ABBRE- VIATION		Time Sched Max = 19 Spaces  Transcript Max = 20 Spaces	
						Changing Atmosphere	
						Changing Atmosphere	
Course Description				Course Description for Official Publication (Max = 50 words)			
				The science of the greenhouse effect, stratospheric ozone depletion, polar ozone holes, and urban smog. These phenomena and their possible consequences are discussed, along with the properties and behavior of the atmosphere and its components of the environment.			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j				<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised				Prereq <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/advl Work <input type="checkbox"/> Ugrad or Rokhm Grad		Credit Hours Min Max <input type="text"/> <input type="text"/>	Contact Hrs/Wk <input type="text"/> Number of Wks <input type="text"/>	<b>Level of Credit</b> <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/advl Work <input type="checkbox"/> Ugrad or Rokhm Grad		Credit Hours Min Max <input type="text"/> <input type="text"/>	Contact Hrs/Wk <input type="text"/> Number of Wks <input type="text"/>

□

<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		<b>Cognizant Faculty Member:</b> Perry Samson		<b>Title</b> Professor	
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty					
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		<b>Approved by Name</b> <input type="text"/>		<b>Approved Date</b> <input type="text"/>		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		<input type="text"/> <input type="text"/> <input type="text"/>		<input type="text"/> <input type="text"/> <input type="text"/>		Home Dept. <b>Department Chair Name</b> <b>Chair Signature</b> Cross-listed <b>Climate &amp; Space</b> Dept(s) <b>Environment</b> <b>Chemistry</b> <b>Environmental Sciences &amp; Engin</b>			

Updated CARF in support of new department name change and new curriculum.....

Updated CARF in support of new department name change and new curriculum.....

Detail the Special requirements

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.....
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THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2693

Date 10/20/2015

Effective Term Winter 2016

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2693

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	Home Department		Course Number
AOSS Atmos, Oceanic & Space Sci		171	CLIMATE Climate & Meteorology		171
Cross Listed Course Information			Cross Listed Course Information		
UC		110	UC		110
Biology		110	Biology		110
SNRE		110	EARTH Earth and Envir Sci		171
Geol Sci		171			
Course Title			Course Title		
Introduction to Global Change			Introduction to Global Chng I		
TITLE		Time Sched	TITLE		Time Sched
ABBRE-		Max = 19 Spaces	ABBRE-		Max = 19 Spaces
VIATION		Transcript	VIATION		Transcript
		Max = 20 Spaces			Max = 20 Spaces
Course Description			Course Description for Official Publication (Max = 50 words)		
			The course will consider the evolution of the universe, the Earth and its environments, and the evolution of living organisms. Consideration will be given to fundamental processes by which organisms grow and reproduce, how they interact with their environments, and the distribution of major groups of organisms on earth.		
PROGRAM OUTCOMES:		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	PROGRAM OUTCOMES:		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j
Degree Requirements		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	Degree Requirements		<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective
Prereq			Prereq		
<input type="radio"/> Enforced			<input type="radio"/> Enforced		
<input type="radio"/> Advised			<input type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit		Credit Hours	Level of Credit		Credit Hours
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad		Min Max	<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad		Min Max
<input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types			<input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types		
<input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work		Number of Wks	<input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work		Number of Wks
<input type="checkbox"/> Ugrad or Rokhm Grad			<input type="checkbox"/> Ugrad or Rokhm Grad		
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?		
<input type="radio"/> Yes		Max Hours?	<input checked="" type="radio"/> No		Max Times?
<input type="radio"/> No			<input type="radio"/> Yes		Can it be repeated in the same term?
<input type="radio"/> Yes			<input type="radio"/> No		
Class Type(s)		Grading	Cognizant Faculty Member:		Title
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other		<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor			
<input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		<input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station			
Graded Section		<input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other		<input type="checkbox"/> S/U <input type="checkbox"/> Extension			
<input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Course Is Y Graded <input type="checkbox"/>			
Approval Info		Approved by Name	Submitted By:		Chair Name
<input type="checkbox"/> Curriculum Comm.			<input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.		
			Department		Chair Signature
			Home Dept. Climate & Space		
			Cross-listed UC		
			Dept(s). Biology		
			SNRE		

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2694

Date 10/20/2015

Effective Term Winter 2016

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2694

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	Home Department		Course Number
AOSS Atmos, Oceanic & Space Sci		172	CLIMATE Climate & Meteorology		172
Cross Listed Course Information			Cross Listed Course Information		
Geol Science		172	EARTH Earth and Envir Sci		172
Sociology		111	Sociology		111
SNRE		111	SNRE		111
UC		111	UC		111
Course Title			Course Title		
Introduction to Global Change II			Introduction to Global Change II		
TITLE ABBREVIATION		Time Sched Max = 19 Spaces	TITLE ABBREVIATION		Time Sched Max = 19 Spaces
Transcript Max = 20 Spaces			Transcript Max = 20 Spaces		
Course Description			Course Description for Official Publication (Max = 50 words)		
An introduction to the evolution of life and the human species on earth, with focus on problems of global change produced by recent human advances in technology and institutions.					
PROGRAM OUTCOMES:		<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	PROGRAM OUTCOMES:		<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k
Degree Requirements		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	Degree Requirements		<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective
Prereq		<input type="radio"/> Enforced <input type="radio"/> Advised	Prereq		<input type="radio"/> Enforced <input type="radio"/> Advised
Credit Restrictions			Credit Restrictions		
Level of Credit		Credit Hours Min Max Contact Hrs/Wk Number of Wks	Level of Credit		Credit Hours Min Max Contact Hrs/Wk Number of Wks
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addr'l Work <input type="checkbox"/> Ugrad or Rackham Grad			<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addr'l Work <input type="checkbox"/> Ugrad or Rackham Grad		

C. Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?

Class Type(s)	Grading	Location	Cognizant Faculty Member:	Title
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind <input type="checkbox"/> Other	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		
Graded Section			Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind <input type="checkbox"/> Other				

Approval Info	Approved by Name	Approved Date	Submitted By:	<input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.
<input type="checkbox"/> Curriculum Comm.			Department Chair Name	Chair Signature
<input type="checkbox"/> Faculty			Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1			Cross-listed UC	
<input type="checkbox"/> Cross listed Unit 2			Dept(s) Earth and Envir. Sci	
			SOC	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Date	10/14/2015
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Date	10/14/2015
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Course Offer Freq ☒ Indefinitely  
☐ One term only

2653

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Home Department		Course Number		Course Number	
<b>AOSS Atmos, Oceanic &amp; Space Sci</b>		<b>280</b>		<b>CLIMATE Climate &amp; Meteorology</b>	
Cross Listed Course Information				Cross Listed Course Information	
				<b>SPACE Space Science &amp; Engineering</b>	
Course Title				Course Title	
Undergraduate Research Experience					
TITLE ABBREVIATION		Time Sched Max = 19 Spaces		Ugrad Res Experience	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces		Ugrad Res Experience	
Course Description				Course Description for Official Publication (Max = 50 words)	
Individual or group research experience in atmospheric and space sciences. The program of work is arranged at the beginning of the semester by mutual agreement between the student and a faculty member. Written and/or oral reports will be required.				Individual or group research experience in climate and space sciences. The program of work is arranged at the beginning of the semester by mutual agreement between the student and a faculty member. Written and/or oral reports will be required.	
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j				<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> k <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised				Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions				Credit Restrictions	
<b>Level of Credit</b> <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Rackham Grad w/add'l Work		<b>Credit Hours</b> Min    Max 1      4		<b>Contact Hrs/Wk</b> 4-12 <b>Number of Wks</b> 13	
<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Rackham Grad w/add'l Work		<b>Credit Hours</b> Min    Max 1      4		<b>Contact Hrs/Wk</b> 3-12 <b>Number of Wks</b> 13	
Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?) <input checked="" type="radio"/> Yes <input type="radio"/> No              Max Hours? 8    Max Times? 999              Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No					
<b>Class Type(s)</b> <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
<b>Graded Section</b> <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		Course Is Y Graded <input type="checkbox"/>			
Cognizant Faculty Member:		Title			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty					
Approval Info		Approved By Name		Approved Date	
<input type="checkbox"/> Curriculum Comm.					
<input type="checkbox"/> Faculty					
<input type="checkbox"/> Cross listed Unit 1					
<input type="checkbox"/> Cross listed Unit 2					
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.					
Department Chair Name		Chair Signature			
Home Dept. Climate & Space					
Cross-listed Dept(s) .....					

Updated CARE is support of new department name change and new curriculum.....

[illegible]

Form Number **2655**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci		320	CLIMATE Climate & Meteorology	320
<input checked="" type="checkbox"/>	Cross Listed Course Information		Cross Listed Course Information	
	Geological Sciences	GEOSCI 320	SPACE Space Science & Engineering	320
			EARTH Earth and Environmental Sciences	320
Course Title			Course Title	
Earth Systems Evolution			Earth and Space Systems Evolution	
TITLE	Time Sched	Earth Sys Evolution	TITLE	Time Sched
ABBREVIATION	Max = 19 Spaces		ABBREVIATION	Max = 19 Spaces
	Transcript	Earth Sys Evolution		Transcript
	Max = 20 Spaces			Max = 20 Spaces
Course Description			Course Description for Official Publication (Max = 50 words)	
Introduction to the physics and chemistry of Earth. Gravitational energy, radiative energy, Earth's energy budget, and Earth tectonics are discussed along with chemical evolution and biogeochemical cycles. The connections among the carbon cycle, silicate weathering, and the natural greenhouse effect are discussed. Required for AOSS/GS-321, which introduces Earth system dynamics.			Introduction to the physics and chemistry of Earth. Gravitational energy, radiative energy, Earth's energy budget, and Earth tectonics are discussed along with chemical evolution and biogeochemical cycles. The connections among the carbon cycle, silicate weathering, and the natural greenhouse effect are discussed. Required for CLIMATE/SPACE/EARTH 321, which introduces Earth and Space System dynamics.	
PROGRAM OUTCOMES:			PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements			Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input checked="" type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq			Prereq	
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Math 115, Math 116; (C or better) <input checked="" type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions			Credit Restrictions	
Level of Credit			Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Undergrad or Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work <input type="checkbox"/> Undergrad or Rokhm Grad			<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Undergrad or Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work <input type="checkbox"/> Undergrad or Rokhm Grad	
Credit Hours	Contact Hrs/Wk	4	Credit Hours	Contact Hrs/Wk
Min	Max	4	Min	Max
4	4	14	3	3
Number of Wks			Number of Wks	
14			14	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				
C. Class Type(s)				
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				
Grading				
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U				
Location				
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension				
Cognizant Faculty Member: Title				
Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				
Course is Y Graded <input type="checkbox"/>				
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty				
Approval Info				
<input type="checkbox"/> Curriculum Comm. Approved by Name Approved Date				
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2				
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.				
Department Chair Name Chair Signature				
Home Dept. Climate and Space Sciences and Engineering				
Cross-listed Dept(s) Earth and Environ. Sci				

Form Number

2655

SUPPORTING STATEMENT

Credit change for new curriculum courses required in the two new degree programs (effective Fall Term 2015)

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2637

Date 8/12/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	Home Department		Course Number
AOSS Atmos, Oceanic & Space Sci		321	CLIMATE Climate & Meteorology		321
Cross Listed Course Information			Cross Listed Course Information		
Geological Sciences GEOSCI		321	SPACE Space Science & Engineering		321
			EARTH Earth and Environmental Science		321
Course Title			Course Title		
Earth System Dynamics			Earth and Space System Dynamics		
TITLE	Time Sched	Earth System Dynam	TITLE	Time Sched	Earth & Sp Sys Dyn
ABBREVIATION	Max = 19 Spaces		ABBREVIATION	Max = 19 Spaces	
	Transcript	Earth System Dynam		Transcript	Earth & Sp Sys Dyn
	Max = 20 Spaces			Max = 20 Spaces	
Course Description			Course Description for Official Publication (Max = 50 words)		
			This course will describe the major wind systems and ocean currents that are important to climate studies. The primary equations will be developed and simple solutions derived that will explain many of these motions. The relations among the dynamics and other parameters in the climate system will be illustrated by examples from both paleo and present day systems.		
PROGRAM OUTCOMES:			PROGRAM OUTCOMES:		
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j		
Degree Requirements			Degree Requirements		
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input checked="" type="radio"/> Core Course <input type="radio"/> Tech Elective		
Prereq			Prereq		
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			<input type="radio"/> Enforced <input checked="" type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit			Level of Credit		
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/advl Work <input type="checkbox"/> Ugrad or Rokhm Grad		Credit Hours Min Max 4 4	<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/advl Work <input type="checkbox"/> Ugrad or Rokhm Grad		Credit Hours Min Max 3 3
		Contact Hrs/Wk Number of Wks 4 14			Contact Hrs/Wk Number of Wks 3 14
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable?			Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable?		
<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? _____ Max Times? _____			<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? _____ Max Times? _____		
Can it be repeated in the same term?			Can it be repeated in the same term?		
<input type="radio"/> Yes <input checked="" type="radio"/> No			<input type="radio"/> Yes <input checked="" type="radio"/> No		
Class Type(s)			Cognizant Faculty Member:		
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			Title		
Grading					
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension					
Graded Section			Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty		
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind					
Course Is Y Graded <input type="checkbox"/>					
Approval Info			Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.		
<input type="checkbox"/> Curriculum Comm.					
Approved by Name			Department Chair Name		
Approved Date			Chair Signature		
<input type="checkbox"/> Faculty			Home Dept. Climate and Space Sciences and Engineering		
<input type="checkbox"/> Cross listed Unit 1			Cross-listed Earth and Environ. Sci		
<input type="checkbox"/> Cross listed Unit 2			Dept(s):		

Form Number

2637

SUPPORTING STATEMENT

Updated CARF is support of new department name change and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2656

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	323	CLIMATE Climate & Meteorology	323
Cross Listed Course Information		Cross Listed Course Information	
GEOSCI Geological Sciences	323	SPACE Space Science & Engineering	323
		Earth Earth and Environmental	323
Course Title		Course Title	
Earth System Analysis		Earth Sys Analysis	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
		Introduction to the analysis of Earth and Atmospheric Science Systems. Topics include linear systems, harmonic analysis, sampling theory and statistical error analysis. Lectures emphasize underlying mathematical concepts. Labs emphasize application of mathematical methods to analysis of field data in a computer programming environment. Applications include turbulent air motion in the planetary boundary layer, cloud and precipitation microphysical composition, oceanic wave propagation, stratospheric ozone depletion and satellite remote sensing.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq		Prereq	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rackham Grad w/adv'd Work		<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rackham Grad w/adv'd Work	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
		6	
		4 4 14	

Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)	Grading	Location	Cognizant Faculty Member:	Title
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension			
Graded Section			Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				

Approval Info	Approved by Name	Approved Date	Submitted By:	<input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.
<input type="checkbox"/> Curriculum Comm.				
<input type="checkbox"/> Faculty			Department Chair Name	Chair Signature
<input type="checkbox"/> Cross listed Unit 1			Home Dept. Climate and Space Sciences and Engineering	
<input type="checkbox"/> Cross listed Unit 2			Cross-listed Dept(s): Earth and Environmental Sciences	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN – COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2657**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

Home Department Course Number  
AOSS Atmos, Oceanic & Space Sci 350

☒ Cross Listed Course Information

GEOSCI Geological Sciences 350

Course Title

TITLE  
ABBRE-  
VIATION

Time Sched  
Max = 19 Spaces  
Transcript  
Max = 20 Spaces

Course Description

B. REQUESTED LISTING

Home Department Course Number  
CLIMATE Climate & Meteorology 350

Cross Listed Course Information

SPACE Space Science & Engineering 350  
EARTH Earth and Envir Sci 350

Course Title

Atmospheric Thermodynamics

TITLE  
ABBRE-  
VIATION

Time Sched  
Max = 19 Spaces  
Transcript  
Max = 20 Spaces

Course Description for Official Publication (Max = 50 words)

Fundamentals of thermodynamics are presented, including the First, Second and Third Laws, ideal gases, adiabatic processes, phase changes, vapor pressure, humidity, and atmospheric stability. The Kinetic Theory of Gases provides a molecular perspective on the various forms of atmospheric water substance and on macroscopic phenomenology in general.

PROGRAM OUTCOMES: ☐ a ☐ c ☐ e ☐ g ☐ i ☐ k  
☐ b ☐ d ☐ f ☐ h ☐ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☐ Core Course ☐ Tech Elective

Prereq

- ☐ Enforced  
☐ Advised

Credit Restrictions

Level of Credit  
☐ Undergrad only  
☐ Rackham Grad  
☐ Non-Rackham Grad  
☐ Ugrad or Rackham Grad

Credit Hours  
Min Max  
4 4

Contact  
Hrs/Wk  
4

PROGRAM OUTCOMES: ☒ a ☐ c ☐ e ☐ g ☒ i ☒ k  
☐ b ☐ d ☐ f ☒ h ☒ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☒ Core Course ☐ Tech Elective

Prereq Math 216 or equivalent, C or better

- ☒ Enforced  
☐ Advised

Credit Restrictions

Level of Credit  
☒ Undergrad only  
☐ Rackham Grad  
☐ Non-Rackham Grad  
☐ Ugrad or Rackham Grad

Credit Hours  
Min Max  
3 3

Contact  
Hrs/Wk  
3

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)  
☒ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Grading  
☒ A-E ☐ CR/NC  
☐ P/F ☐ S/U

Graded Section  
☐ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Cognizant Faculty Member: Title

Ann Arbor Biological Station Camp Davis Extension

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info  
☐ Curriculum Comm.

Approved by Name Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

☐ Faculty  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

Department Chair Name Chair Signature

Home Dept. Climate & Space

Cross-listed Earth and Environ Sci

Dept(s).

Form Number

2657

SUPPORTING STATEMENT

Updated GARF to support new department name change and new curriculum.

No current student will be negatively impacted by the credit change of this course.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Date: 10/14/2015


☐ *Not a member of the Society*

Course No. \_\_\_\_\_

2658

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely

## Home Department

Cross Listed Course Information		Cross Listed Course Information																													
GEOSCI Geological Sciences		EARTH Earth and Envir Sci																													
470		370																													
Course Title		Course Title																													
Solar-Terrestrial Relations		Solar-Terrestrial Relations																													
<table border="1"> <tr> <td>TITLE ABBR- VIATION</td> <td>Time Sched Max = 19 Spaces</td> </tr> <tr> <td>Transcript Max = 20 Spaces</td> <td></td> </tr> </table>		TITLE ABBR- VIATION	Time Sched Max = 19 Spaces	Transcript Max = 20 Spaces		<table border="1"> <tr> <td>TITLE ABBR- VIATION</td> <td>Time Sched Max = 19 Spaces</td> <td>Solar-Terr Rel.</td> </tr> <tr> <td>Transcript Max = 20 Spaces</td> <td></td> <td>Solar-Terr Relations</td> </tr> </table>		TITLE ABBR- VIATION	Time Sched Max = 19 Spaces	Solar-Terr Rel.	Transcript Max = 20 Spaces		Solar-Terr Relations																		
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Transcript Max = 20 Spaces																															
TITLE ABBR- VIATION	Time Sched Max = 19 Spaces	Solar-Terr Rel.																													
Transcript Max = 20 Spaces		Solar-Terr Relations																													
Course Description		Course Description for Official Publication (Max = 50 words)																													
Introduction to solar terrestrial relations with an overview of solar radiation and its variability on all time-scales. The effects of this variability on the near-Earth space environment and upper atmosphere are considered, as well as effects on the lower and middle atmosphere with connections to weather and climate. Subjects are approached through extensive data analysis, including weekly computer lab sessions.		Introduction to solar terrestrial relations with an overview of solar radiation and its variability on all time-scales. The effects of this variability on the near-Earth space environment and upper atmosphere are considered, as well as effects on the lower and middle atmosphere with connections to weather and climate. Subjects are approached through extensive data analysis, including weekly computer lab sessions.																													
<table border="1"> <tr> <td>PROGRAM OUTCOMES:</td> <td><input type="checkbox"/> a</td> <td><input type="checkbox"/> c</td> <td><input type="checkbox"/> e</td> <td><input type="checkbox"/> g</td> <td><input type="checkbox"/> i</td> <td><input type="checkbox"/> k</td> </tr> <tr> <td></td> <td><input type="checkbox"/> b</td> <td><input type="checkbox"/> d</td> <td><input type="checkbox"/> f</td> <td><input type="checkbox"/> h</td> <td><input type="checkbox"/> j</td> <td></td> </tr> </table>		PROGRAM OUTCOMES:	<input type="checkbox"/> a	<input type="checkbox"/> c	<input type="checkbox"/> e	<input type="checkbox"/> g	<input type="checkbox"/> i	<input type="checkbox"/> k		<input type="checkbox"/> b	<input type="checkbox"/> d	<input type="checkbox"/> f	<input type="checkbox"/> h	<input type="checkbox"/> j		<table border="1"> <tr> <td>PROGRAM OUTCOMES:</td> <td><input checked="" type="checkbox"/> a</td> <td><input type="checkbox"/> c</td> <td><input type="checkbox"/> e</td> <td><input checked="" type="checkbox"/> g</td> <td><input checked="" type="checkbox"/> i</td> <td><input checked="" type="checkbox"/> k</td> </tr> <tr> <td></td> <td><input type="checkbox"/> b</td> <td><input checked="" type="checkbox"/> d</td> <td><input type="checkbox"/> f</td> <td><input type="checkbox"/> h</td> <td><input type="checkbox"/> j</td> <td></td> </tr> </table>		PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a	<input type="checkbox"/> c	<input type="checkbox"/> e	<input checked="" type="checkbox"/> g	<input checked="" type="checkbox"/> i	<input checked="" type="checkbox"/> k		<input type="checkbox"/> b	<input checked="" type="checkbox"/> d	<input type="checkbox"/> f	<input type="checkbox"/> h	<input type="checkbox"/> j	
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Prereq <input type="radio"/> Enforced <input type="radio"/> Advised		Prereq Math 216 and Physics 240 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised																													
Credit Restrictions		Credit Restrictions																													
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Level of Credit	Credit Hours	Contact Hrs/Wk																													
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1

<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind	<input type="checkbox"/> Other ____ <input checked="" type="checkbox"/> A-E <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	Michael Liemohn   	Professor   
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Course Is Y Graded <input type="checkbox"/>		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.	<b>Approved by Name</b>  	<b>Approved Date</b>  	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2	   	   	Home Dept. <b>Department Chair Name</b> Climate & Space Cross-listed <b>Chair Name</b> Earth and Envir Sci Dept(s) .....
			<b>Chair Signature</b>   

Updated CARF in support of new department name change and new curriculum.

[illegible]

Detail the Special requirements

[illegible]

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2659**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/14/2015**

Effective Term **Fall 2015**

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

Home Department Course Number  
AOSS Atmos, Oceanic & Space Sci 380

☒ Cross Listed Course Information

GEOSCI Geological Sciences 381

Course Title

TITLE  
Max = 19 Spaces  
ABBREVIATION  
Transcript  
Max = 20 Spaces

Course Description

B. REQUESTED LISTING

Home Department Course Number  
CLIMATE Climate & Meteorology 380

Cross Listed Course Information

SPACE Space Science & Engineering 380  
EARTH Earth and Environmental Sciences 381

Course Title

Introduction to Atmospheric Radiation

TITLE  
Max = 19 Spaces  
ABBREVIATION  
Transcript  
Max = 20 Spaces

Course Description for Official Publication (Max = 50 words)

Basic concepts and processes of radiative transfer including radiometric quantities, electromagnetic spectrum, absorption, emission, scattering. The physics laws governing these processes including the Planck Law and the Kirchhoff Law. Radiative properties of atmospheric constituents. Reflection and refraction. Introductory-level descriptions of relevant applications in atmospheric sciences and climate physics.

PROGRAM OUTCOMES: ☐ a ☐ c ☐ e ☐ g ☐ i ☐ k  
☐ b ☐ d ☐ f ☐ h ☐ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☐ Core Course ☐ Tech Elective

Prereq

- ☐ Enforced  
☐ Advised

Credit Restrictions

Level of Credit  
☐ Undergrad only  
☐ Rackham Grad  
☐ Non-Rackham Grad  
☐ Ugrad or Rackham Grad  
☐ Ugrad or Non-Rackham Grad  
☐ All Credit types  
☐ Rackham Grad w/adv'd Work

Credit Hours  
Min Max  
4 4  
Contact Hrs/Wk  
Number of Wks  
4 14

PROGRAM OUTCOMES: ☒ a ☐ c ☒ e ☐ g ☒ i ☒ k  
☐ b ☐ d ☐ f ☒ h ☒ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☒ Core Course ☐ Tech Elective

Prereq Math 216 or equivalent, C or better

- ☒ Enforced  
☐ Advised

Credit Restrictions

Level of Credit  
☒ Undergrad only  
☐ Rackham Grad  
☐ Non-Rackham Grad  
☐ Ugrad or Rackham Grad  
☐ Ugrad or Non-Rackham Grad  
☐ All Credit types  
☐ Rackham Grad w/adv'd Work

Credit Hours  
Min Max  
3 3  
Contact Hrs/Wk  
Number of Wks  
3 14

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)  
☒ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Grading  
☒ A-E ☐ Ann Arbor  
☐ CR/NC ☐ Biological Station  
☐ P/F ☐ Camp Davis  
☐ S/U ☐ Extension

Graded Section  
☒ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Cognizant Faculty Member: Title

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info  
☐ Curriculum Comm.

Approved by Name

Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

☐ Faculty  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

Department Chair Name

Home Dept. Climate & Space

Cross-listed Earth and Environ. Sci

Dept(s):

Chair Signature

Form Number

2659

SUPPORTING STATEMENT

Updated GARF in support of new department name change and new curriculum

No current student will be negatively impacted by the credit change of this course

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN – COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2660**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number		Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci				CLIMATE Climate & Meteorology		381	
Cross Listed Course Information				Cross Listed Course Information			
				SPACE Space Science & Engineering		381	
Course Title				Course Title			
Undergraduate Research Experience II				Undergraduate Research Experience II			
TITLE	Time Sched	TITLE	Time Sched	TITLE	Time Sched	TITLE	Time Sched
ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces
VATION	Transcript	VATION	Transcript	VATION	Transcript	VATION	Transcript
	Max = 20 Spaces		Max = 20 Spaces		Max = 20 Spaces		Max = 20 Spaces
Course Description				Course Description for Official Publication (Max = 50 words)			
Individual or group research experience in atmospheric, space science, or space technology. The program of work is arranged at the beginning of the semester by mutual agreement between the student and a faculty member. Written and/or oral reports will be required.				Individual or group research experience in climate, space science, or space technology. The program of work is arranged at the beginning of the semester by mutual agreement between the student and a faculty member. Written and/or oral reports will be required.			
PROGRAM OUTCOMES:				PROGRAM OUTCOMES:			
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k				<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> d <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements				Degree Requirements			
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq				Prereq			
AOSS 280 or junior/senior standing				CLIMATE 280, SPACE 280 or junior/senior standing, C or better			
<input type="radio"/> Enforced <input type="radio"/> Advised				<input checked="" type="radio"/> Enforced better <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Successful completion of 4 credits of AOSS 280							
Level of Credit				Level of Credit			
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad				<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad			
Credit Hours				Credit Hours			
Min Max				Min Max			
Contact Hrs/Wk				Contact Hrs/Wk			
Number of Wks				Number of Wks			
1 4				1 4			
13				13			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?				Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input checked="" type="radio"/> Yes <input type="radio"/> No				<input checked="" type="radio"/> Yes <input type="radio"/> No			
Max Hours? 8				Max Hours? 8			
Max Times? 4				Max Times? 4			
Can it be repeated in the same term?				Can it be repeated in the same term?			
<input type="radio"/> Yes <input checked="" type="radio"/> No				<input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)				Class Type(s)			
<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind				<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind			
Grading				Grading			
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U				<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U			
Location				Location			
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension				<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Cognizant Faculty Member:				Cognizant Faculty Member:			
Brian Gilchrist				Brian Gilchrist			
Title				Title			
Professor				Professor			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty				Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
Approval Info				Approval Info			
<input type="checkbox"/> Curriculum Comm.				<input type="checkbox"/> Curriculum Comm.			
Approved by Name				Approved by Name			
Approved Date				Approved Date			
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.				Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
Department Chair Name				Department Chair Name			
Climate & Space				Climate & Space			
Chair Signature				Chair Signature			
<i>M. M. Davis</i>				<i>M. M. Davis</i>			
Cross-listed				Cross-listed			
Dept(s).				Dept(s).			

Form Number  
2660

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2661**

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department AOSS Atmos, Oceanic & Space Sci		Course Number 401	
Cross Listed Course Information GEOSCI Geological Sciences		Cross Listed Course Information EARTH Earth and Envir. Sci 401	
Course Title		Course Title Geophysical Fluid Dynamics	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words) Dynamics of the oceans and atmosphere. Equations of motion in spherical coordinates, beta-plane approximation, wave properties in the oceans and atmosphere.	
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		PROGRAM OUTCOMES: <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq Physics 240, Math 215, Math 216, AOSS 323 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised		Prereq Physics 240, Math 215, Math 216, CLIMATE 323, SPACE 323 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min 4 Max 4		Credit Hours Min 3 Max 3	
Contact Hrs/Wk 4		Contact Hrs/Wk 3	
Number of Wks 14		Number of Wks 14	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Cognizant Faculty Member: Title	
Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info <input type="checkbox"/> Curriculum Comm.		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Approved by Name		Department Chair Name	
Approved Date		Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1		Cross-listed Earth and Environ Sci	
<input type="checkbox"/> Cross listed Unit 2		Dept(s)	

Form Number

2661

SUPPORTING STATEMENT

Updated CARE in support of new department name change and curriculum.

No current student will be negatively impacted by the credit change of this course.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2662

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	405	CLIMATE Climate & Meteorology	405
Cross Listed Course Information		Cross Listed Course Information	
		SPACE Space Science & Engineering 405	
Course Title		Course Title	
		Special Topics	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
Advances in specific fields of Atmospheric, Oceanic and Space Sciences as revealed by recent research.		Advances in specific fields of Climate and Space Sciences as revealed by recent research.	
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other		Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input checked="" type="radio"/> Other	
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised		Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk		Contact Hrs/Wk	
Number of Wks		Number of Wks	

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No		Max Hours? 16 Max Times? Can it be repeated in the same term? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Cognizant Faculty Member: staff	
Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Title Professor	
Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info <input type="checkbox"/> Curriculum Comm.		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Approved by Name		Department Chair Name	
Approved Date		Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1			
<input type="checkbox"/> Cross listed Unit 2			

Form Number 2662

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2663

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	410	CLIMATE Climate & Meteorology	410
Cross Listed Course Information		Cross Listed Course Information	
GEOSCI Geological Sciences		EARTH Earth and Envir Sci	409
Course Title		Course Title	
Earth System Modeling		Earth System Modeling	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Earth System Model		Earth System Model	
Earth System Modeling		Earth System Modeling	
Course Description		Course Description for Official Publication (Max = 50 words)	
Introduction to Earth System Modeling; Discussion of energy balance models, carbon cycle models, and atmospheric chemistry models with multiple time scales; Methods for numerical solution and practice building and analyzing results from models.			
PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> d <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k
Degree Requirements	<input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective	Degree Requirements	<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective
Prereq	AOSS 320, AOSS 321	Prereq	CLIMATE 320, CLIMATE 321, SPACE 320, SPACE 321
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit	Credit Hours	Level of Credit	Credit Hours
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	Min Max 4 4	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	Min Max 4 4
Ugrad or Non-Rackham Grad		Ugrad or Non-Rackham Grad	
All Credit types		All Credit types	
Rackham Grad w/adv'd Work		Rackham Grad w/adv'd Work	
Number of Wks		Number of Wks	14

Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s) ☐ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading ☐ A-E ☒ CR/NC ☐ P/F ☐ S/U

Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Graded Section ☐ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Cognizant Faculty Member: Title

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info ☐ Curriculum Comm. ☐ Faculty ☐ Cross listed Unit 1 ☐ Cross listed Unit 2

Approved by Name Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name Chair Signature

Home Dept. Climate & Space

Cross-listed Dept(s): Earth and Envir Sci

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

Form Number

2663



THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2665

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	414	CLIMATE Climate & Meteorology	414
Cross Listed Course Information		Cross Listed Course Information	
GEOSCI Geological Sciences	414	EARTH Earth and Envir Sci	414
Course Title		Course Title	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Weather Systems		Weather Systems	
Course Description		Course Description for Official Publication (Max = 50 words)	
Introduction to the basic characteristics, thermodynamics, and dynamics of atmospheric weather systems on Earth and other planets. The students are exposed to observations of weather systems while reviewing non-dimensional analysis, dynamics and thermodynamics. Weather systems on earth are compared to that of other planets and analytical tools are used to gain insights into their basic physics.			
PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k
Degree Requirements	<input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective	Degree Requirements	<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective
Prereq	AOSS 350, AOSS 401 or AOSS 551	Prereq	CLIMATE 350, SPACE 350, CLIMATE 401 or CLIMATE 551
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit	Credit Hours Min Max Undergrad only Rackham Grad Non-Rackham Grad Ugrad or Rackham Grad	Level of Credit	Credit Hours Min Max Undergrad only Rackham Grad Non-Rackham Grad Ugrad or Rackham Grad

Repeatability (Indi Research, Dir. Study, Dissertation):	Is this course repeatable?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Max Hours? <input type="text"/>	Max Times? <input type="text"/>	Can it be repeated in the same term?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Class Type(s)	Grading	Location	Cognizant Faculty Member:	Title		
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	Frank Marsik	Assoc Res Scientist		
Graded Section	Course Is Y Graded <input type="checkbox"/>					
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty					
Approval Info	Approved by Name	Approved Date	Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
<input type="checkbox"/> Curriculum Comm.			Department Chair Name	Chair Signature		
<input type="checkbox"/> Faculty			Home Dept. Climate & Space			
<input type="checkbox"/> Cross listed Unit 1			Cross-listed Dept(s):			
<input type="checkbox"/> Cross listed Unit 2						

Form Number

2665

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2666

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	422	CLIMATE Climate & Meteorology	422
<input checked="" type="checkbox"/> Cross Listed Course Information		<input type="checkbox"/> Cross Listed Course Information	
<input checked="" type="checkbox"/> GEOSCI Geological Sciences		<input type="checkbox"/> EARTH Earth and Envir Sci	423
<input type="checkbox"/> Course Title		<input type="checkbox"/> Course Title	
<input type="checkbox"/> TITLE ABBREVIATION	<input type="checkbox"/> Time Sched Max = 19 Spaces <input type="checkbox"/> Transcript Max = 20 Spaces	<input type="checkbox"/> TITLE ABBREVIATION	<input type="checkbox"/> Time Sched Max = 19 Spaces <input type="checkbox"/> Transcript Max = 20 Spaces
<input type="checkbox"/> Course Description		<input type="checkbox"/> Boundary Layer Meteorology	
		<input type="checkbox"/> Boundary Layer Met	
		<input type="checkbox"/> Course Description for Official Publication (Max = 50 words)	
		Explores processes in the atmospheric boundary layer, which plays an important role in the exchange of energy, mass and momentum between land and atmosphere. Topics include applications of governing atmospheric equations, atmospheric turbulence, turbulent kinetic energy, the surface energy balance, and the collection and analysis of field flux tower data.	
<input type="checkbox"/> PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
<input type="checkbox"/> Degree Requirements	<input type="checkbox"/> Degree Requirement <input type="checkbox"/> Core Course <input type="checkbox"/> Free Elective <input type="checkbox"/> Tech Elective <input type="checkbox"/> Other	<input type="checkbox"/> Degree Requirements	<input type="checkbox"/> Degree Requirement <input type="checkbox"/> Core Course <input checked="" type="checkbox"/> Free Elective <input type="checkbox"/> Tech Elective <input type="checkbox"/> Other
<input checked="" type="checkbox"/> Prereq	AOSS 350 or equivalent	<input type="checkbox"/> Prereq	CLIMATE 350, SPACE 350 or equivalent
<input type="checkbox"/> Enforced		<input type="checkbox"/> Enforced	
<input type="checkbox"/> Advised		<input checked="" type="checkbox"/> Advised	
<input type="checkbox"/> Credit Restrictions		<input type="checkbox"/> Credit Restrictions	
<input type="checkbox"/> Level of Credit	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Level of Credit	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad
<input type="checkbox"/> Credit Hours	<input type="checkbox"/> Min <input type="checkbox"/> Max	<input type="checkbox"/> Credit Hours	<input type="checkbox"/> Min <input type="checkbox"/> Max
<input type="checkbox"/> Contact Hrs/Wk	<input type="checkbox"/> Number of Wks	<input type="checkbox"/> Contact Hrs/Wk	<input type="checkbox"/> Number of Wks

<input checked="" type="checkbox"/> Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Max Hours? <input type="text"/>	Max Times? <input type="text"/>	Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No	
<input type="checkbox"/> Class Type(s)	<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other	<input type="checkbox"/> Grading	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<input type="checkbox"/> Location	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
<input type="checkbox"/> Graded Section	<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other	<input type="checkbox"/> Course Is Y Graded	<input type="checkbox"/>	<input type="checkbox"/> Cognizant Faculty Member:	<input type="checkbox"/> Title
<input type="checkbox"/> Approval Info	<input type="checkbox"/> Curriculum Comm.	<input type="checkbox"/> Approved by Name	<input type="checkbox"/> Approved Date	<input type="checkbox"/> Submitted By:	<input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.
<input type="checkbox"/> Faculty	<input type="checkbox"/> Cross listed Unit 1	<input type="checkbox"/> Cross listed Unit 2	<input type="checkbox"/>	<input type="checkbox"/> Department Chair Name	<input type="checkbox"/> Chair Signature
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Home Dept.	<input type="checkbox"/> Climate & Space
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cross-listed Dept(s):	<input type="checkbox"/> Earth and Envir Sci

Form Number

2666

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.....

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2667

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	440	CLIMATE Climate & Meteorology	440
Cross Listed Course Information		Cross Listed Course Information	
GEOSCI Geological Sciences		EARTH Earth and Envir Sci 454	
Course Title		Course Title	
TITLE ABBREVIATION		TITLE ABBREVIATION	
Time Sched Max = 19 Spaces		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description		Course Description for Official Publication (Max = 50 words)	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
Degree Requirements		Degree Requirements	
Prereq		Prereq	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	

X

X

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.....

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

C.

Repeatability (Indl Research, Dir. Study, Dissertation: Is this course repeatable?)		Can it be repeated in the same term?	
Class Type(s)		Cognizant Faculty Member:	
Grading		Title	
Location		Frank J. Marsik	
Graded Section		Asst. Res. Sci.	
Course Is Y Graded		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info		Submitted By:	
Approved by Name		Chair Name	
Approved Date		Chair Signature	
Faculty		Home Dept.	
Cross listed Unit 1		Cross-listed Dept(s)	
Cross listed Unit 2			

Form Number

2667

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2668

Date 10/14/2015

Effective Term Winter 2016

Form Number 2668

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		441	
<input checked="" type="checkbox"/> Cross Listed Course Information			
Course Title			
Meteorology and Climate of the Rockies			
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces
	Transcript Max = 20 Spaces		Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
This course introduces principles of atmospheric and environmental sciences using the Rocky Mountains as a field laboratory. Students will develop an understanding of meteorological processes to explain variations in microclimates, and the importance of mountainous regions on the earth's climate. Students will gain field-based knowledge of mountain climates and instrumentation.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		PROGRAM OUTCOMES: <input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other		Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input checked="" type="radio"/> Tech Elective <input type="radio"/> Other	
Prereq AOSS 320, AOSS 321, AOSS 323		Prereq CLIMATE/SPACE 320, CLIMATE/SPACE 321, CLIMATE/SPACE 323	
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised		<input checked="" type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk		Contact Hrs/Wk 48	
Number of Wks		Number of Wks 3	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other		Cognizant Faculty Member: Title	
Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U <input type="checkbox"/> Extension		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Course Is Y Graded <input type="checkbox"/>			
Approval Info <input type="checkbox"/> Curriculum Comm.		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Approved by Name		Department Chair Name	
Approved Date		Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1			
<input type="checkbox"/> Cross listed Unit 2		Cross-listed Dept(s):	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☒ Yes ☐ No

Detail the Special requirements

The field class will be offered at Camp Davis in Wyoming. The availability of atmospheric measurement equipment for probing the atmospheric boundary layer and the unique setting provided at the Geological Sciences Field Camp are the two main special requirements. Vans for travel to and from field camp will be required to transport the students and GSI to Camp Davis as well as the instrumentation that will be brought to field camp.

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2669**

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		442	
<input checked="" type="checkbox"/> Cross Listed Course Information ENSCEN Environmental Sciences & Engin			
Course Title			
Ocean Dynamics I			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description			
Wave motions; group velocity and dispersion. Gravity waves, wave statistics and prediction methods; long period waves; the tides. Steady state circulation, including theories of boundary currents and the thermocline.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq AOSS 401			
<input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work <input type="checkbox"/> Ugrad or Rokhm Grad			
Credit Hours Min Max		Contact Hrs/Wk Number of Wks	
3 3		3 3	
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> Max Hours? <input type="radio"/> Max Times? <input type="radio"/> Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)		Grading	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	
Graded Section		Location	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Cognizant Faculty Member: _____ Title _____ _____ _____ Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info		Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Department Chair Name Climate & Space Environmental Sciences & Engin Dept(s): _____	
Approved by Name		Chair Signature	
_____		_____	
Approved Date		_____	
_____		_____	

Form Number  
2669

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2670

Date 10/14/2015

Effective Term Winter 2016

Form Number  
2670

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		451	
Cross Listed Course Information			
ENSCEN Environmental Sciences & Engin		451	
GEOSCI Geological Sciences		457	
Course Title		Course Title	
Atmospheric Dynamics I			
TITLE ABBRE- VIATION		TITLE ABBRE- VIATION	
Time Sched Max = 19 Spaces		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description		Course Description for Official Publication (Max = 50 words)	
Quasi-geostrophic energetics; fronts; the mean circulation; planetary and equatorial waves; overview of the dynamics of the middle atmosphere; wave-mean flow interaction; spectral methods; and tropical meteorology.			
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective	
Prereq AOSS 401 or MATH 450		Prereq CLIMATE 401 or Math 450	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk		Contact Hrs/Wk	
Number of Wks		Number of Wks	
4		4	
14		14	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No			
Max Hours? Max Times? Can it be repeated in the same term?			
<input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Title	
Graded Section		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
Approval Info		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.		Department Chair Name	
Chair Signature		Chair Signature	
Home Dept. Climate & Space		Home Dept. Climate & Space	
Cross-listed Environmental Sciences & Engin		Cross-listed Environmental Sciences & Engin	
Dept(s) Earth and Envir Sci		Dept(s) Earth and Envir Sci	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2671

Date	10/14/2015
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Effective Term	Winter 2016
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Course Offer Freq ☒ Indefinitely  
☐ One term only

2671

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely

Modifications - A modified information, B & C completely

Deletions - A & C completely

### B. REQUESTED LISTING

Home Department		Course Number		Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		462		CLIMATE Climate & Meteorology		462	
Cross Listed Course Information				Cross Listed Course Information			
				SPACE Space Science & Engineering 462			
Course Title				Course Title			
				Instrumentation for Atmospheric and Space Sciences			
TITLE ABBRE- VIATION		Time Sched Max = 19 Spaces  Transcript Max = 20 Spaces		TITLE ABBRE- VIATION		Time Sched Max = 19 Spaces  Transcript Max = 20 Spaces	
						Instruments ATM SPA  Instruments ATM SPA	
Course Description				Course Description for Official Publication (Max = 50 words)			
				Introduction to fundamentals of atmospheric, space-based, and meteorological instrumentation. Includes basics of electronic sensors, optics, lasers, radar, data acquisition/management, error analysis, and data presentation. Consists of two lectures and one lab each week, and a team-based term project.			
PROGRAM OUTCOMES:		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		PROGRAM OUTCOMES:		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		<input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other		Degree Requirements		<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other	
Prereq AOSS 350 <input checked="" type="radio"/> Enforced <input type="radio"/> Advised				Prereq CLIMATE 350, SPACE 350 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit		Credit Hours		Level of Credit		Credit Hours	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		<input type="checkbox"/> Ugrad or Non-Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work	
		Min Max Number of Wks				Min Max Number of Wks	
		Contact Hrs/Wk				Contact Hrs/Wk	
		4 4				4 4	
		14				14	

9

<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input checked="" type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension		<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		<b>Cognizant Faculty Member:</b> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>		<b>Title</b> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input checked="" type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind						Course Is Y Graded <input type="checkbox"/>			
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.						<b>Approved by Name</b> <div style="border: 1px solid black; height: 30px; width: 100%;"></div>		<b>Approved Date</b> <div style="border: 1px solid black; height: 30px; width: 100%;"></div>	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2						Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.		<b>Department</b> <b>Chair Name</b> <b>Chair Signature</b>	
						Home Dept. <b>Climate &amp; Space</b>		<div style="border: 1px solid black; height: 30px; width: 100%;"></div>	
						Cross-listed Dept(s): .....		<div style="border: 1px solid black; height: 30px; width: 100%;"></div>	

Updated CARF in support of new department name and new curriculum.

[illegible]

Detail the Special requirements

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.....

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THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2672

Date 10/14/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Form Number

2672

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		466	
Cross Listed Course Information			
Course Title			
Carbon-Climate Interaction			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces		
Course Description			
The class will focus on the exchange of carbon among reservoirs in the Earth system -- atmosphere, ocean, lithosphere and biosphere -- and the role of carbon dioxide, CO <sub>2</sub> , as a greenhouse gas.			
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq For undergrads: AOSS 320 and AOSS 321			
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/addr1 Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/addr1 Work <input checked="" type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
		3 3	
Contact Hrs/Wk		Contact Hrs/Wk	
Number of Wks		Number of Wks	
		15	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	
Graded Section		Title	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Gretchen Keppel-Aleks Assistant Professor	
Course Is Y Graded <input type="checkbox"/>			
Approval Info		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Department Chair Name Chair Signature Home Dept. Climate & Space Cross-listed Dept(s):	

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2673

Date	10/14/2015
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Effective Term	Winter 2016
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**Course Offer Freq** ☒ Indefinitely  
☐ One term only

2673

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

## B. REQUESTED LISTING

Cross Listed Course Information				Cross Listed Course Information																										
X	CHEM Chemistry	467		CHEM	467																									
	GEOSCI Geological Sciences	465		EARTH Earth and Envir Sci	465																									
	ENSCEN	467		ENSCEN Environmental Sciences & Engin	467																									
	ENVIRON-Environment			ENVIRON																										
	Course Title			Course Title																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;">TITLE</td> <td style="width: 25%; padding: 2px;">Time Sched</td> <td style="width: 50%; padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">ABBR- VIATION</td> <td style="padding: 2px;">Max = 19 Spaces</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Transcript</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Max = 20 Spaces</td> <td style="padding: 2px;"></td> </tr> </table>			TITLE	Time Sched		ABBR- VIATION	Max = 19 Spaces			Transcript			Max = 20 Spaces		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;">TITLE</td> <td style="width: 25%; padding: 2px;">Time Sched</td> <td style="width: 50%; padding: 2px;">Biogeochem. Cycles</td> </tr> <tr> <td style="padding: 2px;">ABBR- VIATION</td> <td style="padding: 2px;">Max = 19 Spaces</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Transcript</td> <td style="padding: 2px;">Biogeochem</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Max = 20 Spaces</td> <td style="padding: 2px;"></td> </tr> </table>			TITLE	Time Sched	Biogeochem. Cycles	ABBR- VIATION	Max = 19 Spaces			Transcript	Biogeochem		Max = 20 Spaces	
TITLE	Time Sched																													
ABBR- VIATION	Max = 19 Spaces																													
	Transcript																													
	Max = 20 Spaces																													
TITLE	Time Sched	Biogeochem. Cycles																												
ABBR- VIATION	Max = 19 Spaces																													
	Transcript	Biogeochem																												
	Max = 20 Spaces																													
	Course Description			Course Description for Official Publication (Max = 50 words)																										
				The biogeochemical cycles of water, carbon, nitrogen, and sulfur; the atmosphere and oceans as reservoirs and reaction media; the fate of natural and man-made sources of carbon, nitrogen, and sulfur compounds; the interactions among the major biogeochemical cycles and resultant global change; greenhouse gases, acid rain and ozone depletion.																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; background-color: #d3d3d3; padding: 2px;"><b>PROGRAM OUTCOMES:</b></td> <td style="padding: 2px;"> <input type="checkbox"/> a   <input type="checkbox"/> c   <input type="checkbox"/> e   <input type="checkbox"/> g   <input type="checkbox"/> i   <input type="checkbox"/> k  <input type="checkbox"/> b   <input type="checkbox"/> d   <input type="checkbox"/> f   <input type="checkbox"/> h   <input type="checkbox"/> j </td> </tr> </table>			<b>PROGRAM OUTCOMES:</b>	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; background-color: #d3d3d3; padding: 2px;"><b>PROGRAM OUTCOMES:</b></td> <td style="padding: 2px;"> <input checked="" type="checkbox"/> a   <input type="checkbox"/> c   <input type="checkbox"/> e   <input checked="" type="checkbox"/> g   <input type="checkbox"/> i   <input type="checkbox"/> k  <input checked="" type="checkbox"/> b   <input type="checkbox"/> d   <input type="checkbox"/> f   <input checked="" type="checkbox"/> h   <input type="checkbox"/> j </td> </tr> </table>			<b>PROGRAM OUTCOMES:</b>	<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input type="checkbox"/> j																				
<b>PROGRAM OUTCOMES:</b>	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j																													
<b>PROGRAM OUTCOMES:</b>	<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input type="checkbox"/> j																													
	<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective																										
	Prereq <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Prereq   Math 116, Chem 210, Phys 240 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised																										
	Credit Restrictions			Credit Restrictions																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;"> <b>Level of Credit</b>  <input type="checkbox"/> Undergrad only   <input type="checkbox"/> Ugrad or Non-Rokhm Grad  <input type="checkbox"/> Rackham Grad   <input type="checkbox"/> All Credit types  <input type="checkbox"/> Non-Rokhm Grad   <input type="checkbox"/> Rokhm Grad w/add'l Work  <input type="checkbox"/> Ugrad or Rokhm Grad </td> <td style="width: 15%; padding: 2px;"> Credit Hours  Min   Max </td> <td style="width: 15%; padding: 2px;"> Contact Hrs/Wk  Number of Wks </td> <td style="width: 30%; padding: 2px;"> </td> </tr> </table>			<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	Credit Hours Min   Max	Contact Hrs/Wk Number of Wks		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;"> <b>Level of Credit</b>  <input type="checkbox"/> Undergrad only   <input type="checkbox"/> Ugrad or Non-Rokhm Grad  <input type="checkbox"/> Rackham Grad   <input checked="" type="checkbox"/> All Credit types  <input type="checkbox"/> Non-Rokhm Grad   <input type="checkbox"/> Rokhm Grad w/add'l Work  <input type="checkbox"/> Ugrad or Rokhm Grad </td> <td style="width: 15%; padding: 2px;"> Credit Hours  Min   Max </td> <td style="width: 15%; padding: 2px;"> Contact Hrs/Wk  Number of Wks </td> <td style="width: 30%; padding: 2px;"> </td> </tr> </table>			<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	Credit Hours Min   Max	Contact Hrs/Wk Number of Wks																	
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	Credit Hours Min   Max	Contact Hrs/Wk Number of Wks																												
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	Credit Hours Min   Max	Contact Hrs/Wk Number of Wks																												
	Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No   Max Hours?   Max Times?   Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			<input type="radio"/> Yes <input checked="" type="radio"/> No   Max Hours?   Max Times?   Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;"> <b>Class Type(s)</b>  <input checked="" type="checkbox"/> Lec   <input type="checkbox"/> Sem   <input type="checkbox"/> Dis   <input type="checkbox"/> Other  <input type="checkbox"/> Rec   <input type="checkbox"/> Lab   <input type="checkbox"/> Ind </td> <td style="width: 25%; padding: 2px;"> <b>Grading</b>  <input checked="" type="checkbox"/> A-E   <input type="checkbox"/> CR/NC  <input type="checkbox"/> P/F   <input type="checkbox"/> S/U </td> <td style="width: 25%; padding: 2px;"> <b>Location</b>  <input checked="" type="checkbox"/> Ann Arbor   <input type="checkbox"/> Biological Station  <input type="checkbox"/> Camp Davis   <input type="checkbox"/> Extension </td> <td style="width: 25%; padding: 2px;"> </td> </tr> </table>			<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;"> <b>Cognizant Faculty Member:</b> </td> <td style="width: 50%; padding: 2px;"> <b>Title</b> </td> </tr> <tr> <td style="height: 40px;"></td> <td></td> </tr> </table>			<b>Cognizant Faculty Member:</b>	<b>Title</b>																		
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension																												
<b>Cognizant Faculty Member:</b>	<b>Title</b>																													
	<b>Graded Section</b> <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty																										
	Course Is Y Graded <input type="checkbox"/>																													
	<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.			Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.																										
	<b>Approved by Name</b> <b>Approved Date</b>			<b>Department</b> <b>Chair Name</b> <b>Chair Signature</b>																										
	<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2			Home Dept.   Climate & Science																										
				Cross-listed Dept(s)   CHEM																										
				Earth and Envir. Sci.																										
				ENSCEN																										

Updated CARF in support of new department name and new curriculum.

Updated CARF in support of new department name and new curriculum.

Detail the Special requirements

Detail the Special requirements

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THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2674

Date 10/14/2015

Effective Term Winter 2016

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2674

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	474	CLIMATE Climate & Meteorology	474
Cross Listed Course Information		Cross Listed Course Information	
EARTH Earth and Environmental Sciences 474			
Course Title		Course Title	
Ice Sheets, Glaciers and Climate Change			
TITLE	Time Sched	TITLE	Time Sched
ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces
VIATION	Transcript	VIATION	Transcript
	Max = 20 Spaces		Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
The dynamics and mass balance of ice sheets and glaciers introduced along with mathematical theories describing how ice sheets and glaciers flow and current methods of observation. The course integrates lectures, assignments and discussion of journal articles.			
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> k <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective	
Prereq		Prereq Math 115 and 116	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
Contact Hrs/Wk		Contact Hrs/Wk	
13		13	

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?

☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)

☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading

☒ A-E ☐ Ann Arbor ☐ CR/NC ☐ Biological Station ☐ P/F ☐ Camp Davis ☐ S/U ☐ Extension

Location

Course Is Y Graded ☐

Cognizant Faculty Member:

Jeremy N. Bassis

Title

Assistant Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info

☐ Curriculum Comm. ☐ Faculty ☐ Cross listed Unit 1 ☐ Cross listed Unit 2

Approved by Name

Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name

Chair Signature

Home Dept. Climate & Space

Cross-listed Dept(s): Earth and Envir Sci

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Date 10/14/2015

Date 10/14/2015

Effective Term	Winter 2016
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Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2676

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

### B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number												
AOSS Atmos, Oceanic & Space Sci	475	CLIMATE Climate & Meteorology	475												
<div style="border: 1px solid black; padding: 2px;">X</div> Cross Listed Course Information		Cross Listed Course Information													
ENSCEN Environmental Sciences & Engin	475	ENSCEN Environmental Sciences & Engin	475												
GEOSCI Geological Sciences	475	EARTH Earth and Envir Sci	475												
Course Title		Course Title													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">TITLE ABBRE- VIATION</td> <td style="width: 25%;">Time Sched Max = 19 Spaces</td> <td style="width: 25%;">Transcript Max = 20 Spaces</td> <td style="width: 25%;"></td> </tr> </table>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Transcript Max = 20 Spaces		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">TITLE ABBRE- VIATION</td> <td style="width: 25%;">Time Sched Max = 19 Spaces</td> <td style="width: 25%;">Transcript Max = 20 Spaces</td> <td style="width: 25%;">Earth Systm Intrac</td> </tr> </table>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Transcript Max = 20 Spaces	Earth Systm Intrac				
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Transcript Max = 20 Spaces													
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Transcript Max = 20 Spaces	Earth Systm Intrac												
Course Description		Course Description for Official Publication (Max = 50 words)  Students will work on open-ended research problems with mathematical models from Earth System Science. The models may include, for example, surface characteristics, hydrology, solar-land-ocean-atmosphere exchanges, and space-based observations. Numerical experiments will promote further understanding and interpretation of earth system interactions, team building, and scientific communication.													
<div style="background-color: #90EE90; padding: 5px;">PROGRAM OUTCOMES:</div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j         </div>		<div style="background-color: #90EE90; padding: 5px;">PROGRAM OUTCOMES:</div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> k  <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j         </div>													
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective													
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised		Prereq    Senior standing in science or engineering <input checked="" type="radio"/> Enforced <input type="radio"/> Advised													
Credit Restrictions		Credit Restrictions													
<b>Level of Credit</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rckhsm Grad  <input type="checkbox"/> Non-Rckhsm Grad  <input type="checkbox"/> Ugrad or Rckhsm Grad         </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Ugrad or Non-Rckhsm Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rckhsm Grad w/addl Work         </td> </tr> </table>		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rckhsm Grad <input type="checkbox"/> Non-Rckhsm Grad <input type="checkbox"/> Ugrad or Rckhsm Grad	<input type="checkbox"/> Ugrad or Non-Rckhsm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rckhsm Grad w/addl Work	<b>Level of Credit</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rckhsm Grad  <input type="checkbox"/> Non-Rckhsm Grad  <input type="checkbox"/> Ugrad or Rckhsm Grad         </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Ugrad or Non-Rckhsm Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rckhsm Grad w/addl Work         </td> </tr> </table>		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rckhsm Grad <input type="checkbox"/> Non-Rckhsm Grad <input type="checkbox"/> Ugrad or Rckhsm Grad	<input checked="" type="checkbox"/> Ugrad or Non-Rckhsm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rckhsm Grad w/addl Work								
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rckhsm Grad <input type="checkbox"/> Non-Rckhsm Grad <input type="checkbox"/> Ugrad or Rckhsm Grad	<input type="checkbox"/> Ugrad or Non-Rckhsm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rckhsm Grad w/addl Work														
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rckhsm Grad <input type="checkbox"/> Non-Rckhsm Grad <input type="checkbox"/> Ugrad or Rckhsm Grad	<input checked="" type="checkbox"/> Ugrad or Non-Rckhsm Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rckhsm Grad w/addl Work														
Credit Hours    Contact Hrs/Wk    Number of Wks <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Min    Max</td> <td style="width: 33%;">Min    Max</td> <td style="width: 33%;">Min    Max</td> </tr> <tr> <td style="text-align: center;">4    4</td> <td style="text-align: center;">4    4</td> <td style="text-align: center;">4    4</td> </tr> </table>		Min    Max	Min    Max	Min    Max	4    4	4    4	4    4	Credit Hours    Contact Hrs/Wk    Number of Wks <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Min    Max</td> <td style="width: 33%;">Min    Max</td> <td style="width: 33%;">Min    Max</td> </tr> <tr> <td style="text-align: center;">4    4</td> <td style="text-align: center;">4    4</td> <td style="text-align: center;">14    14</td> </tr> </table>		Min    Max	Min    Max	Min    Max	4    4	4    4	14    14
Min    Max	Min    Max	Min    Max													
4    4	4    4	4    4													
Min    Max	Min    Max	Min    Max													
4    4	4    4	14    14													
Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?) <input type="radio"/> Yes <input checked="" type="radio"/> No    Max Hours?    Max Times?    Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No															
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other ____ <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Cognizant Faculty Member:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> </table>													
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other ____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Title <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> </table>													
Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty													
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.													
Approved by Name    Approved Date <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 60%; height: 20px;"></td><td style="width: 40%; height: 20px;"></td></tr> </table>				Department    Chair Name    Chair Signature <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Home Dept.</td> <td style="width: 33%;">Climate &amp; Space</td> <td style="width: 33%;"></td> </tr> <tr> <td>Cross-listed</td> <td>Environmental Sciences &amp; Engin</td> <td></td> </tr> <tr> <td>Dept(s)</td> <td>Earth and Envir Sci</td> <td></td> </tr> </table>		Home Dept.	Climate & Space		Cross-listed	Environmental Sciences & Engin		Dept(s)	Earth and Envir Sci		
Home Dept.	Climate & Space														
Cross-listed	Environmental Sciences & Engin														
Dept(s)	Earth and Envir Sci														
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2															

Updated CARF in support of new department name and new curriculum.

[illegible]

Detail the Special requirements

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.....

Form Number **2698**

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		476	
Cross Listed Course Information			
Course Title			
Ocean Dynamics and Climate			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces
	Transcript Max = 20 Spaces		Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
Large-scale physical oceanography and the role of the ocean in climate. Theory and observations of the wind-driven and thermohaline circulation, vortices and planetary waves.			
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective	
Prereq AOSS 401 or AOSS 551		Prereq CLIMATE 401 or CLIMATE 551 OR SPACE 551	
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
Contact Hrs/Wk		Contact Hrs/Wk	
4		4	
14		14	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		John P. Boyd	
Grading		Title	
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		Professor	
Location			
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Graduated Section		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
Approval Info		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.			
Approved by Name		Department Chair Name	
Approved Date		Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate and Space	
<input type="checkbox"/> Cross listed Unit 1			
<input type="checkbox"/> Cross listed Unit 2			

Form Number  
**2698**

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Effective Term

- Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

Home Department Course Number  
AOSS Atmos, Oceanic & Space Sci 478

☐ Cross Listed Course Information

☐ Course Title

TITLE  
Max = 19 Spaces  
Transcript  
Max = 20 Spaces

☐ Course Description

PROGRAM OUTCOMES: ☐ a ☐ c ☐ e ☐ g ☐ i ☐ k  
☐ b ☐ d ☐ f ☐ h ☐ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☐ Core Course ☐ Tech Elective

Prereq  
☐ Enforced  
☐ Advised

☐ Credit Restrictions

Level of Credit  
☐ Undergrad only ☐ Ugrad or Non-Rokhm Grad  
☐ Rackham Grad ☐ All Credit types  
☐ Non-Rokhm Grad ☐ Rokhm Grad w/adv'd Work  
☐ Ugrad or Rokhm Grad

Credit Hours  
Min Max  
Contact  
Hrs/Wk  
Number  
of Wks

B. REQUESTED LISTING

Home Department Course Number  
CLIMATE Climate & Meteorology 478

☐ Cross Listed Course Information

Course Title  
Engineering for Space Environment

TITLE  
Max = 19 Spaces  
Transcript  
Max = 20 Spaces

Course Description for Official Publication (Max = 50 words)

This course will cover the basics of the Sun and the solar wind and their influence on the space environment. In addition, atmospheric effects on spacecraft are considered. We discuss not only the physics of the drivers of space weather, but also the implications for satellite systems and their design and operation.

PROGRAM OUTCOMES: ☒ a ☐ c ☒ e ☒ g ☒ i ☐ k  
☐ b ☐ d ☐ f ☒ h ☒ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☒ Core Course ☐ Tech Elective

Prereq Senior or graduate standing  
☐ Enforced  
☒ Advised

☐ Credit Restrictions

Level of Credit  
☐ Undergrad only ☐ Ugrad or Non-Rokhm Grad  
☐ Rackham Grad ☐ All Credit types  
☐ Non-Rokhm Grad ☐ Rokhm Grad w/adv'd Work  
☒ Ugrad or Rokhm Grad

Credit Hours  
Min Max  
Contact  
Hrs/Wk  
Number  
of Wks

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)  
☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading  
☒ A-E ☐ CR/NC ☐ P/F ☐ S/U ☐ Extension

Graded Section  
☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Course is Y Graded ☐

Cognizant Faculty Member: Susan Lepri Title Associate Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info  
☐ Curriculum Comm. Approved by Name Approved Date

Submitted By: ☐ Home Dept. ☐ Cross-listed Dept.

☐ Faculty  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

Department Chair Name  
Climate & Meteorology

Cross-listed Dept(s)

Chair Signature

SUPPORTING STATEMENT

Updated CARE in support of new curriculum, subject name and new department name

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

Form Number 2678

Date 10/14/2015

Effective Term Winter 2016

Form Number 2678

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		480	
<input type="checkbox"/> Cross Listed Course Information			
Course Title			
CLIMATE Climate & Meteorology 480			
<input type="checkbox"/> Cross Listed Course Information			
NRE Nat Resources & Environment 480			
Course Title			
Climate Change: The Move to Action			
TITLE	Time Sched	TITLE	Time Sched
ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces
VIATION	Transcript	VIATION	Transcript
	Max = 20 Spaces		Max = 20 Spaces
Clim Change Action			
Clim Change Action			
Course Description			
Course Description for Official Publication (Max = 50 words)			
All sectors of society are affected by climate change: science, policy, business, economics, public health, energy, ecosystems, environmental engineering, journalism, religion, etc. This course explores the intersections of these communities and exposes students the factual and contextual elements that will allow effective participation in the adaptation to climate change.			
PROGRAM OUTCOMES:			
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			
PROGRAM OUTCOMES:			
<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> d <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j			
Degree Requirements			
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Degree Requirements			
<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Prereq Senior or Graduate Standing, Math 116			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Credit Restrictions			
Level of Credit			
Level of Credit			
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work			
<input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work			
Credit Hours			
Credit Hours			
Min Max			
Min Max			
Number of Wks			
Number of Wks			
Term			
Term			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No			
<input type="radio"/> Yes <input checked="" type="radio"/> No			
Max Hours? Max Times?			
Max Hours? Max Times?			
Can it be repeated in the same term?			
Can it be repeated in the same term?			
<input type="radio"/> Yes <input type="radio"/> No			
<input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)			
Class Type(s)			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other			
Grading			
Grading			
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U			
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U			
Location			
Location			
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Cognizant Faculty Member:			
Cognizant Faculty Member:			
Richard B. Rood			
Richard B. Rood			
Title			
Title			
Professor			
Professor			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
Approval Info			
Approval Info			
<input type="checkbox"/> Curriculum Comm.			
<input type="checkbox"/> Curriculum Comm.			
Approved by Name			
Approved by Name			
Approved Date			
Approved Date			
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
Department Chair Name			
Department Chair Name			
Chair Signature			
Chair Signature			
Home Dept. Climate & Space			
Home Dept. Climate & Space			
Cross-listed Nat Resources & Environment			
Cross-listed Nat Resources & Environment			
Dept(s):			
Dept(s):			

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2679

Date 10/14/2015

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

Home Department Course Number  
AOSS Atmos, Oceanic & Space Sci 498

☒ Cross Listed Course Information

☒ Course Title  
Practicum in Atmospheric, Oceanic and Space Sciences

☒ TITLE ABBREVIATION  
Time Sched Max = 19 Spaces  
Transcript Max = 20 Spaces

☒ Course Description  
Students taking this course will participate in research and/or engineering tasks. Supervision will be undertaken by faculty and engineers of the AOSS department. Reporting requirements include a final written summary. Diverse tasks include aircraft spacecraft and rocket payload design field campaign support calibration simulation test. Students will join an active research program of AOSS for a given semester.

PROGRAM OUTCOMES: ☐ a ☐ c ☐ e ☐ g ☐ i ☐ k  
☐ b ☐ d ☐ f ☐ h ☐ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☐ Core Course ☐ Tech Elective

Prereq  
☐ Enforced  
☐ Advised

☐ Credit Restrictions

Level of Credit  
☐ Undergrad only ☐ Undergrad or Non-Rokhm Grad  
☐ Rackham Grad ☐ All Credit types  
☐ Non-Rokhm Grad ☐ Rokhm Grad w/advd Work  
☐ Undergrad or Rokhm Grad

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ☒ Yes ☐ No Max Hours? 8 Max Times? 8 Can it be repeated in the same term? ☐ Yes ☒ No

☒ Class Type(s)  
☐ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Grading Location  
☐ A-E ☒ Ann Arbor  
☐ CR/NC ☐ Biological Station  
☐ P/F ☐ Camp Davis  
☐ S/U ☐ Extension

Graded Section  
☐ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Approval Info  
☐ Curriculum Comm.  
☐ Faculty  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

B. REQUESTED LISTING

Home Department Course Number  
CLIMATE Climate & Meteorology 498

Cross Listed Course Information  
SPACE Space Science & Engineering 498

Course Title  
Practicum in Climate and Space Science

TITLE ABBREVIATION  
Time Sched Max = 19 Spaces  
Transcript Max = 20 Spaces

Course Description for Official Publication (Max = 50 words)  
Students taking this course will participate in research and/or engineering tasks. Supervision will be undertaken by faculty and engineers of the Climate & Science department. Reporting requirements include a final written summary. Diverse tasks include aircraft spacecraft and rocket payload design field campaign support calibration simulation test. Students will join an active research program of Climate & Science for a given semester.

PROGRAM OUTCOMES: ☐ a ☐ c ☐ e ☐ g ☐ i ☐ k  
☐ b ☐ d ☐ f ☐ h ☐ j

Degree Requirements ☐ Degree Requirement ☐ Free Elective ☐ Other  
☐ Core Course ☐ Tech Elective

Prereq  
Permission of instructor  
☒ Enforced  
☐ Advised

☐ Credit Restrictions

Level of Credit  
☐ Undergrad only ☐ Undergrad or Non-Rokhm Grad  
☐ Rackham Grad ☐ All Credit types  
☐ Non-Rokhm Grad ☐ Rokhm Grad w/advd Work  
☒ Undergrad or Rokhm Grad

Cognizant Faculty Member: Title  
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Submitted By: ☐ Home Dept. ☐ Cross-listed Dept.

Department Chair Name Chair Signature  
Home Dept. Climate & Space  
Cross-listed Dept(s):

Form Number

2679

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2719**

Date **11/4/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		499	
Cross Listed Course Information			
Course Title			
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces
	Transcript Max = 20 Spaces		Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
Offers research or directed study experience for students in an area of interest to the student and faculty member. An oral presentation and/or written report is due at the end of the term.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised		Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk Number of Wks		Contact Hrs/Wk Number of Wks	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No		Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind		Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind	
Grading <input type="checkbox"/> A-E <input checked="" type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		Grading <input type="checkbox"/> A-E <input checked="" type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Course is Y Graded <input type="checkbox"/>		Course is Y Graded <input type="checkbox"/>	
Approval Info <input type="checkbox"/> Curriculum Comm.		Approval Info <input type="checkbox"/> Curriculum Comm.	
Approved by Name		Approved by Name	
Approved Date		Approved Date	
Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.		Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Department Chair Name		Department Chair Name	
Climate & Space		Climate & Space	
Chair Signature		Chair Signature	
Home Dept.		Home Dept.	
Cross-listed Dept(s)		Cross-listed Dept(s)	

Form Number

2719

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Date	10/14/2015
------	------------

Date	10/14/2015
------	------------

Course Offer Freq ☒ Indefinitely  
☐ One term only

2681

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Home Department		Course Number		Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		501		CLIMATE Climate & Meteorology		501	
Cross Listed Course Information				Cross Listed Course Information			
Course Title				Course Title			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>TITLE</b>  <b>ABBR- VIATION</b> </div> <div style="width: 45%;"> <b>Time Sched</b>            Max = 19 Spaces            Transcript            Max = 20 Spaces         </div> </div>				<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>TITLE</b>  <b>ABBR- VIATION</b> </div> <div style="width: 45%;"> <b>Time Sched</b>            Max = 19 Spaces            Transcript            Max = 20 Spaces         </div> </div>			
Course Description				Course Description for Official Publication (Max = 50 words)			
Current Research efforts will be presented by graduate students and faculty dealing with all phases of the Climate, Atmospheric and Space Sciences				Current Research efforts will be presented by graduate students and faculty dealing with all phases of the climate, atmospheric and space sciences			
<b>PROGRAM OUTCOMES:</b> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j         </div>				<b>PROGRAM OUTCOMES:</b> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j         </div>			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Tech Elective			
<b>Prereq</b> <input type="radio"/> Enforced <input type="radio"/> Advised				<b>Prereq</b> <b>Graduate Standing</b> <input checked="" type="radio"/> Enforced <input type="radio"/> Advised			
<b>Credit Restrictions</b> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <b>Level of Credit</b>  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad           </div> <div style="width: 45%;"> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work           </div> </div> </div>				<b>Credit Restrictions</b> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <b>Level of Credit</b>  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Undergrad only  <input checked="" type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad           </div> <div style="width: 45%;"> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work           </div> </div> </div>			
<b>Level of Credit</b> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad           </div> <div style="width: 45%;"> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work           </div> </div>				<b>Level of Credit</b> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Undergrad only  <input checked="" type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad           </div> <div style="width: 45%;"> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work           </div> </div>			
<b>Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?)</b> <input checked="" type="radio"/> Yes    Max Hours? <b>16</b> Max Times? <b>1</b> Can it be repeated in the same term? <input checked="" type="radio"/> Yes <input type="radio"/> No				<b>Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?)</b> <input type="radio"/> Yes    Max Hours? <b>16</b> Max Times? <b>1</b> Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
<b>Class Type(s)</b> <input type="checkbox"/> Lec <input checked="" type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				<b>Class Type(s)</b> <input type="checkbox"/> Lec <input checked="" type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
<b>Graded Section</b> <input type="checkbox"/> Lec <input checked="" type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind				<b>Graded Section</b> <input type="checkbox"/> Lec <input checked="" type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.				<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.			
<b>Approved by Name</b>				<b>Approved by Name</b>			
<b>Approved Date</b>				<b>Approved Date</b>			
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2				<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2			
<b>Submitted By:</b> <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.				<b>Submitted By:</b> <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
<b>Department</b>				<b>Department</b>			
<b>Chair Name</b>				<b>Chair Name</b>			
<b>Chair Signature</b>				<b>Chair Signature</b>			

Updated CARE in support of new department name and new curriculum.

### Detail the Special requirements

The class uses teleconference tools to connect the Central Campus with the North Campus.

THE UNIVERSITY OF MICHIGAN – COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2682**

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		524	
Cross Listed Course Information			
ENSCEN Environmental Sciences & Engin		524	
Course Title		Course Title	
General Circulation		General Circulation	
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words) Processes that maintain the general circulation of the Earth's atmosphere the observed general circulation energetics; balance requirements; comparison of observations with simple theories and results from general circulation model simulations.	
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq Previous or concurrent with AOSS 401 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised		Prereq Previous or concurrent with CLIMATE 401; C or better <input checked="" type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input checked="" type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min Max Contact Hrs/Wk Number of Wks		Credit Hours Min Max Contact Hrs/Wk Number of Wks	
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No		Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	
Grading <input checked="" type="checkbox"/> A-E <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension		Grading <input checked="" type="checkbox"/> A-E <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Course is Y Graded <input type="checkbox"/>		Course is Y Graded <input type="checkbox"/>	
Approval Info <input type="checkbox"/> Curriculum Comm.		Approval Info <input type="checkbox"/> Curriculum Comm.	
Approved by Name		Approved by Name	
Approved Date		Approved Date	
Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.		Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.	
Department Chair Name		Department Chair Name	
Chair Signature		Chair Signature	
Home Dept. Environmental Sciences & Engin		Home Dept. Environmental Sciences & Engin	
Climate & Space		Climate & Space	
Dept(s)		Dept(s)	

Form Number  
**2682**

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2684

Date 10/14/2015

Effective Term	Winter 2016
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Course Offer Freq ☒ Indefinitely  
☐ One term only

2684

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely

Modifications - A modified information, B & C completely

Deletions - A & C completely

### B. REQUESTED LISTING

Home Department <b>AOSS Atmos, Oceanic &amp; Space Sci</b>	Course Number <b>CLIMATE Climate &amp; Meteorology</b>												
<input checked="" type="checkbox"/> Cross Listed Course Information	Cross Listed Course Information <b>SPACE Space Science &amp; Engineering</b>												
<input checked="" type="checkbox"/> Course Title <b>Fluid Dynamics for Atmospheric and Space Sciences</b>	Course Title <b>Advanced Fluid Dynamics for Climate and Space Sciences</b>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">TITLE ABBREVIATION</td> <td style="width: 33%;">Time Sched Max = 19 Spaces</td> <td style="width: 33%;"></td> </tr> <tr> <td></td> <td>Transcript Max = 20 Spaces</td> <td></td> </tr> </table>	TITLE ABBREVIATION	Time Sched Max = 19 Spaces			Transcript Max = 20 Spaces		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">TITLE ABBREVIATION</td> <td style="width: 33%;">Time Sched Max = 19 Spaces</td> <td style="width: 33%;">Advanced Fluid Dynamics</td> </tr> <tr> <td></td> <td>Transcript Max = 20 Spaces</td> <td>Advanced Fluid Dynamics</td> </tr> </table>	TITLE ABBREVIATION	Time Sched Max = 19 Spaces	Advanced Fluid Dynamics		Transcript Max = 20 Spaces	Advanced Fluid Dynamics
TITLE ABBREVIATION	Time Sched Max = 19 Spaces												
	Transcript Max = 20 Spaces												
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	Advanced Fluid Dynamics											
	Transcript Max = 20 Spaces	Advanced Fluid Dynamics											
<input type="checkbox"/> Course Description	Course Description for Official Publication (Max = 50 words)  Covers the fundamentals of fluid Dynamics. The purpose of the course is to provide fundamental grounding in fluid dynamics and in fundamental mathematical technique at the level required to do serious quantitative graduate research that involves fluid dynamics effects. The emphasis of the examples is on geophysical and space applications.												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; background-color: #d9ead3;">PROGRAM OUTCOMES:</td> <td style="width: 33%;"> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j         </td> <td style="width: 33%;"></td> </tr> </table>	PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; background-color: #d9ead3;">PROGRAM OUTCOMES:</td> <td style="width: 33%;"> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j         </td> <td style="width: 33%;"></td> </tr> </table>	PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j							
PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j												
PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j												
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective												
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	Prereq Math 215, Math 216, and Math 450 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised												
Credit Restrictions	Credit Restrictions												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"><b>Level of Credit</b></td> <td style="width: 33%;">Credit Hours Min Max</td> <td style="width: 33%;">Contact Hrs/Wk Number of Wks</td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> <td> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work         </td> <td> <input type="checkbox"/> Undergrad only  <input checked="" type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> </tr> </table>	<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk Number of Wks	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	<input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"><b>Level of Credit</b></td> <td style="width: 33%;">Credit Hours Min Max</td> <td style="width: 33%;">Contact Hrs/Wk Number of Wks Term</td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only  <input checked="" type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> <td> <input type="checkbox"/> Ugrad or Non-Rackham Grad  <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work         </td> <td> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Non-Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> </tr> </table>	<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk Number of Wks Term	<input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad
<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk Number of Wks											
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	<input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad											
<b>Level of Credit</b>	Credit Hours Min Max	Contact Hrs/Wk Number of Wks Term											
<input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad											
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?	<input type="radio"/> Yes <input checked="" type="radio"/> No												
<input checked="" type="checkbox"/> Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other ___ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	Cognizant Faculty Member:												
<input type="checkbox"/> Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other ___ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	Title												
Course Is Y Graded <input type="checkbox"/>	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty												
Approval Info <input type="checkbox"/> Curriculum Comm.	Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.												
Approved by Name	Approved Date												
<input type="checkbox"/> Faculty	Department Chair Name												
<input type="checkbox"/> Cross listed Unit 1	Chair Signature												
<input type="checkbox"/> Cross listed Unit 2	Home Dept. Climate & Space												
Cross-listed Dept(s)	Cross-listed Dept(s)												

Updated CARE in support of new department name and new curriculum.....

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2699**

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Form Number

2699

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		563	
Cross Listed Course Information			
Course Title			
Air Pollution Dispersion Modeling			
Course Description			
Principles of modeling air pollution transport and dispersion. Discussion of models for line sources, area sources and point sources. Analysis of individual model data requirements, founding assumptions and inherent limitations. Practical experience using currently operational models.			
PROGRAM OUTCOMES:			
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			
Degree Requirements			
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq AOSS 463			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit			
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv1 Work <input type="checkbox"/> Ugrad or Rokhm Grad			
Credit Hours			
<input type="checkbox"/> Min <input type="checkbox"/> Max <input type="checkbox"/> Number of Wks			
Contact Hrs/Wk			
<input type="checkbox"/> Min <input type="checkbox"/> Max <input type="checkbox"/> Number of Wks			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? <input type="text"/> Max Times? <input type="text"/> Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind			
Grading			
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U			
Location			
<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Graded Section			
<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
Approval Info			
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2			
Approved by Name			
Approved Date			
Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.			
Department Chair Name			
Chair Signature			
Home Dept. Climate & Space			
Cross-listed Dept(s): Environmental Sciences & Engin			

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2700**

Date **10/20/2015**

Effective Term **Winter 2016**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number

2700

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		564	
<input checked="" type="checkbox"/> Cross Listed Course Information			
Course Title			
The Stratosphere and Mesosphere			
TITLE	Time Sched		
ABBREVIATION	Max = 19 Spaces		
	Transcript		
	Max = 20 Spaces		
Course Description			
Physical, chemical, and dynamical properties of the atmosphere between the tropopause and the turbopause. Among the topics covered are the heat and radiation budgets, atmospheric ozone, stratospheric warmings, the biennial stratospheric oscillation, airglow.			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq AOSS 464			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work			
Credit Hours	Contact Hrs/Wk		
Min Max	Number of Wks		
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work			
Credit Hours	Contact Hrs/Wk		
Min Max	Number of Wks		
3	3	13	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? <input type="text"/> Max Times? <input type="text"/> Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U			
<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.			
Approved by Name		Approved Date	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept. <b>Department Chair Name</b> Home Dept. Climate & Space Cross-listed Environmental Sciences & Engin Dept(s):	
		Chair Signature	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2701

Date 10/20/2015

Effective Term Winter 2016

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	575
Cross Listed Course Information	
Course Title	
Air Pollution Monitoring	
Air Pollutn Monitor	
Air P Monitor	
Course Description for Official Publication (Max = 50 words)	
A practical introduction to the fundamentals of gas and aerosol measurements with a focus on ozone and acidic gases, their precursors, and aerosols; operation of the suite of instruments, detection and sampling techniques, and calibration practices. An important feature will be team-oriented tasks involving air quality monitoring.	
PROGRAM OUTCOMES:	
Degree Requirements	
Prereq "Previous or concurrent with AOSS 463, AOSS 578, NRE 538"	
Enforced	
Advised	
Credit Restrictions	
Level of Credit	
Credit Hours	
Contact Hrs/Wk	
Number of Wks	

B. REQUESTED LISTING

Home Department	Course Number
CLIMATE Climate & Meteorology	575
Cross Listed Course Information	
ENSCEN Environmental Sciences & Engin	
575	
Course Title	
Air Pollution Monitoring	
Air Pollutn Monitor	
Air P Monitor	
Course Description for Official Publication (Max = 50 words)	
A practical introduction to the fundamentals of gas and aerosol measurements with a focus on ozone and acidic gases, their precursors, and aerosols; operation of the suite of instruments, detection and sampling techniques, and calibration practices. An important feature will be team-oriented tasks involving air quality monitoring.	
PROGRAM OUTCOMES:	
Degree Requirements	
Prereq "Previous or concurrent with CLIMATE 463, CLIMATE 578, NRE 538"	
Enforced	
Advised	
Credit Restrictions	
Level of Credit	
Credit Hours	
Contact Hrs/Wk	
Number of Wks	

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?	
Yes No	
Max Hours? Max Times? Can it be repeated in the same term? Yes No	
Cognizant Faculty Member:	
Title	
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info	
Approved by Name	
Approved Date	
Submitted By: Home Dept. Cross-listed Dept.	
Department Chair Name	
Chair Signature	
Home Dept. Climate & Space	
Cross-listed Environmental Sciences & Engin	
Dept(s):	

Form Number

2701

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? Yes No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2702**

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Form Number

2702

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		576	
Cross Listed Course Information			
Course Title			
TITLE ABBREVIATION		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces			
Course Description			
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq "AOSS 578, NRE 538, AOSS 575, OR AOSS 563"			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
Contact Hrs/Wk		Contact Hrs/Wk	
24		7	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	
Graded Section		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		<input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.	
Approval Info		Department Chair Name	
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		<input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept(s):	
Approved by Name		Chair Signature	
Approved Date			

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2703**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	578	CLIMATE Climate & Meteorology	578
<input checked="" type="checkbox"/> Cross Listed Course Information		<input type="checkbox"/> Cross Listed Course Information	
EIH	666	EHS Environmental Health Sciences	666
		ENSCEN Environmental Sciences & Engin	578
Course Title		Course Title	
		Air Pollution Chemistry	
TITLE	Time Sched	TITLE	Time Sched
ABBRE-	Max = 19 Spaces	ABBRE-	Max = 19 Spaces
VIATION	Transcript	VIATION	Transcript
	Max = 20 Spaces		Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
		Tropospheric and stratospheric air pollution are discussed following a review of thermochemistry, photochemistry and chemical kinetics. Gaseous and particulate air pollutants are considered in terms of their origins and transformations.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k		<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k	
<input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other		<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other	
<input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq AOSS 479 or CHEM 365		Prereq CLIMATE 479 OR CHEM 365	
<input type="radio"/> Enforced		<input type="radio"/> Enforced	
<input checked="" type="radio"/> Advised		<input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
None		None	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad	
<input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types		<input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types	
<input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work		<input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work	
<input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
		3 3 14	

C.

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?		Max Hours? Max Times? Can it be repeated in the same term?	
<input type="radio"/> Yes <input checked="" type="radio"/> No		<input type="radio"/> Yes <input type="radio"/> No	
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other		Title	
<input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Graded Section			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other			
<input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info		Submitted By: <input type="checkbox"/> Home Dept. <input checked="" type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.		Department Chair Name Chair Signature	
		Home Dept. Climate and Space	
<input type="checkbox"/> Faculty		EIH	
<input type="checkbox"/> Cross listed Unit 1		Cross-listed	
<input type="checkbox"/> Cross listed Unit 2		Dept(s). ENSCEN	

Form Number

2703

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2685

Date 10/14/2015

Effective Term Winter 2016

Form Number 2685

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	591	CLIMATE Climate & Meteorology	591
Cross Listed Course Information		Cross Listed Course Information	
Course Title		Course Title	
Climate Practicum I		Climate Practicum I	
TITLE ABBREVIATION		TITLE ABBREVIATION	
Time Sched Max = 19 Spaces		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description		Course Description for Official Publication (Max = 50 words)	
Introduction to individual and team research on real-world problems in the area of applied climate. A mentor from a commercial or government laboratory will pose the problem and help to guide the research. Students will learn how to apply knowledge they have already acquired. This course followed by AOSS 592.		Introduction to individual and team research on real-world problems in the area of applied climate. A mentor from a commercial or government laboratory will pose the problem and help to guide the research. Students will learn how to apply knowledge they have already acquired. This course followed by CLIMATE 592.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq		Prereq	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Senior or graduate standing <input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work <input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
Contact Hrs/Wk		Contact Hrs/Wk	
Number of Wks		Number of Wks	

C.

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?	Max Hours?	Max Times?	Can it be repeated in the same term?
<input type="radio"/> Yes <input checked="" type="radio"/> No			<input type="radio"/> Yes <input type="radio"/> No
Class Type(s)	Grading	Location	Cognizant Faculty Member:
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	Title
Graded Section			
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
Approval Info			
<input type="checkbox"/> Curriculum Comm.			
Approved by Name			
Approved Date			
Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
Department Chair Name			
Chair Signature			
Home Dept. Climate & Space			
Cross-listed Dept(s):			

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.....

Are any special resources or facilities required for this course? ☒ Yes ☐ No

Detail the Special requirements

- (1)..... Projects will be established well in advance through industry contacts to ensure the right number of interesting experiences for the students.....  
(2)..... A mentor will define requirements for each project, which will help to map the scope of and expectations from the project.....  
(3)..... A mentor and students will define a schedule with specific milestones and outcomes to ensure steady progress by the students (e.g., formal requirements management, risk analysis, formal reports, design reviews with customer feedback, etc.).....

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2686

Date 10/14/2015

Effective Term Winter 2016

Form Number 2686

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	592	CLIMATE Climate & Meteorology	592
Cross Listed Course Information		Cross Listed Course Information	
Course Title		Course Title	
Climate Practicum II		Climate Practicum II	
TITLE ABBREVIATION		TITLE ABBREVIATION	
Time Sched Max = 19 Spaces		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description		Course Description for Official Publication (Max = 50 words)	
Introduction to individual and team research on real-world problems in the area of applied climate. On a research project started in AOSS 591 and guided by a mentor from a commercial or government laboratory, students will apply the principles of risk analysis and objective assessment of adaptive strategies.		Introduction to individual and team research on real-world problems in the area of applied climate. On a research project started in CLIMATE 591 and guided by a mentor from a commercial or government laboratory, students will apply the principles of risk analysis and objective assessment of adaptive strategies.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq Senior or Graduate Standing and AOSS 591		Prereq Senior or Graduate Standing and CLIMATE 591	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/ add'l Work	
Min Max Number of Wks		Min Max Number of Wks	
Contact Hrs/Wk		Contact Hrs/Wk	
6		6	

C.

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?		Max Hours? Max Times? Can it be repeated in the same term?	
<input type="radio"/> Yes <input checked="" type="radio"/> No		<input type="radio"/> Yes <input type="radio"/> No	
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Ind		Title	
Grading		Ann Arbor Biological Station	
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		Camp Davis Extension	
Graded Section		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Course Is Y Graded <input type="checkbox"/>	
Approval Info		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.		Department Chair Name Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1		Cross-listed Dept(s):	
<input type="checkbox"/> Cross listed Unit 2			

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☒ Yes ☐ No

Detail the Special requirements

- (1)..... Projects will be established well in advance through industry contacts to ensure the right number of interesting experiences for the students.  
(2)..... A mentor will define requirements for each project, which will help to map the scope of and expectations from the project.  
(3)..... A mentor and students will define a schedule with specific milestones and outcomes to ensure steady progress by the students (e.g., formal requirements management, risk analysis, formal reports, design reviews with customer feedback, etc.)



THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2704**

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
**2704**

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		606	
Cross Listed Course Information			
Course Title			
TITLE ABBREVIATION		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces			
Course Description			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq AOSS 442, AOSS 451, ENGR 102 and MATH 450			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Credit Hours	Contact Hrs/Wk
<input type="checkbox"/> Undergrad only	<input type="checkbox"/> Ugrad or Non-Rokhm Grad	Min	Max
<input type="checkbox"/> Rackham Grad	<input type="checkbox"/> All Credit types		
<input type="checkbox"/> Non-Rokhm Grad	<input type="checkbox"/> Rokhm Grad w/ add'l Work	Number of Wks	
<input type="checkbox"/> Ugrad or Rokhm Grad			
Level of Credit		Credit Hours	Contact Hrs/Wk
<input type="checkbox"/> Undergrad only	<input type="checkbox"/> Ugrad or Non-Rokhm Grad	Min	Max
<input checked="" type="checkbox"/> Rackham Grad	<input type="checkbox"/> All Credit types	3-4	3-4
<input type="checkbox"/> Non-Rokhm Grad	<input type="checkbox"/> Rokhm Grad w/ add'l Work	Number of Wks	14
<input type="checkbox"/> Ugrad or Rokhm Grad			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? <input type="text"/> Max Times? <input type="text"/> Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)		Grading	
<input checked="" type="checkbox"/> Lec	<input type="checkbox"/> Sem	<input type="checkbox"/> Dis	<input type="checkbox"/> Other
<input type="checkbox"/> Rec	<input type="checkbox"/> Lab	<input type="checkbox"/> Ind	
Graded Section		Location	
<input type="checkbox"/> Lec	<input type="checkbox"/> Sem	<input type="checkbox"/> Dis	<input type="checkbox"/> Other
<input type="checkbox"/> Rec	<input type="checkbox"/> Lab	<input type="checkbox"/> Ind	
Course Is Y Graded <input type="checkbox"/>		Cognizant Faculty Member:	
		Title	
		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info		Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.	Approved by Name	Approved Date	
<input type="checkbox"/> Faculty			
<input type="checkbox"/> Cross listed Unit 1			
<input type="checkbox"/> Cross listed Unit 2			
Department		Chair Name	Chair Signature
Home Dept.		Climate & Space	
Cross-listed Dept(s):			

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN – COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2705**

Date **10/20/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		651	
<input type="checkbox"/> Cross Listed Course Information			
Course Title			
Dynamics of Planetary Atmospheres and the Upper Atmosphere			
TITLE	Time Sched		
ABBREVIATION	Max = 19 Spaces		
Transcript	Max = 20 Spaces		
Course Description			
Dynamic meteorology of other planets (Mars, Venus, Jupiter, and Titan), the Earth's middle atmosphere, and thermosphere. Tides, solitary waves, quasi-geostrophic turbulence, and dynamics and chemistry are among the phenomena discussed.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prereq AOSS 451			
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Credit Hours	Contact Hrs/Wk
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Min Max	Number of Wks
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? _____ Max Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)		Grading	Location
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension			
Graded Section		Course Is Y Graded <input type="checkbox"/>	
<input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Approval Info		Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.		Department Chair Name	
Faculty		Climate & Space	
Cross listed Unit 1		Chair Signature	
Cross listed Unit 2		Home Dept.	
		Cross-listed	
		Dept(s).	

Form Number  
**2705**

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2689

Date	10/14/2015
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Effective Term	Winter 2016
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Course Offer Freq ☒ Indefinitely  
☐ One term only

2689

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely

Modifications - A modified information, B & C completely

Deletions - A & C completely

### B. REQUESTED LISTING

<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Cross Listed Course Information</span> <span>SPACE Space Science &amp; Engineering</span> <span>747</span> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Course Title</span> <span>Course Title</span> </div> <div style="display: flex; justify-content: space-between;"> <span>AOSS Student Seminar</span> <span>CLaSP Student Seminar</span> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Course Description</span> <span>Course Description for Official Publication (Max = 50 words)</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Students take turns presenting short research seminars (20 minutes) and/or short talks introducing upcoming speakers in AOSS 749. Some class time will also be devoted to discussions of effective oral and poster presentations and professional ethics.</span> <span>Students take turns presenting short research seminars (20 minutes) and/or short talks introducing upcoming speakers in CLIMATE/SPACE 749. Some class time will also be devoted to discussions of effective oral and poster presentations and professional ethics.</span> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <div style="background-color: #90EE90; padding: 2px; margin-bottom: 5px;"><b>PROGRAM OUTCOMES:</b></div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k</span> <span><input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j</span> </div> </div> <div style="width: 50%;"> <div style="display: flex; justify-content: space-between;"> <span><b>Degree Requirements</b></span> <span><input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="radio"/> Core Course <input type="radio"/> Tech Elective</span> </div> </div> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Prereq</span> <span><input type="radio"/> Enforced <input type="radio"/> Advised</span> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Credit Restrictions</span> <span><input type="checkbox"/> Credit Restrictions</span> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <div style="background-color: #90EE90; padding: 2px; margin-bottom: 5px;"><b>Level of Credit</b></div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad</span> <span><input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv1 Work</span> <span><input type="checkbox"/> Ugrad or Rokhm Grad</span> </div> </div> <div style="width: 50%;"> <div style="display: flex; justify-content: space-between;"> <span><b>Credit Hours</b></span> <span><b>Contact Hrs/Wk</b></span> </div> <div style="display: flex; justify-content: space-between;"> <span>Min Max</span> <span>Number of Wks</span> </div> </div> </div> </div>
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☐ Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?)
☐ Yes ☐ No

**Class Type(s)**

☐ Lec ☐ Sem ☐ Dis ☐ Other
☐ A-E ☐ CR/NC

☐ Rec ☐ Lab ☐ Ind
☐ Ann Arbor ☐ Biological Station

**Graded Section**

☐ Lec ☐ Sem ☐ Dis ☐ Other
☐ P/F ☐ Camp Davis

☐ Rec ☐ Lab ☐ Ind
☐ S/U ☐ Extension

☐ Cognizant Faculty Member:
☐ Title

☐ Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

☐ Approval Info
☐ Approved by Name
☐ Approved Date

☐ Curriculum Comm.
☐ Submitted By: ☐ Home Dept. ☐ Cross-listed Dept.

☐ Faculty
☐ Department
☐ Chair Name
☐ Chair Signature

☐ Cross listed Unit 1
☐ Home Dept.
☐ Climate & Space

☐ Cross listed Unit 2
☐ Cross-listed Dept(s)

Updated CARF in support of new department name change and new curriculum.

Updated CARF in support of new department name change and new curriculum.

Detail the Special requirements

Detail the Special requirements

**Detail the Special Requirements**

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College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2690

Date 10/14/2015

- Complete the following sections:**

New Courses - B & C completely

Modifications - A modified information B & C completely

Deletions - A & C completely

Effective Term	Winter 2016
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**Course Offer Freq** ☒ Indefinitely  
☐ One term only

Form Number

2690

## B. REQUESTED LISTING

☒☒☒☐☐☐

## C.

<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input type="checkbox"/> A-E <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input checked="" type="checkbox"/> S/U <input type="checkbox"/> Extension		<b>Location</b> <input type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		<b>Cognizant Faculty Member:</b> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>		<b>Title</b> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other _____ <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty					
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		<b>Approved by Name</b> <div style="border: 1px solid black; height: 30px; width: 100%;"></div>		<b>Approved Date</b> <div style="border: 1px solid black; height: 30px; width: 100%;"></div>		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.			
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		<div style="border: 1px solid black; height: 30px; width: 100%;"></div>		<div style="border: 1px solid black; height: 30px; width: 100%;"></div>		<b>Department</b> <b>Chair Name</b> <b>Chair Signature</b>			
				Home Dept. <u>Climate &amp; Space</u>					
				Cross-listed Dept(s) .....					

Updated CARF in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

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THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2633**

Date **8/5/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	101	SPACE Space Science & Engineering	101
Cross Listed Course Information		Cross Listed Course Information	
ASTRO Astronomy	103	ASTRO Astronomy	183
Course Title		Course Title	
Rocket Science		Rocket Science	
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
An introduction to the science of space and space exploration. Topics covered include history of spaceflight, rockets, orbits, the space environment, satellites, remote sensing, and the future human presence in space. The mathematics will be at the level of algebra and trigonometry.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other		Degree Requirements <input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Core Course <input type="radio"/> Tech Elective <input type="radio"/> Other	
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised		Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/advd'l Work <input type="checkbox"/> Ugrad or Rackham Grad		Level of Credit <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/advd'l Work <input type="checkbox"/> Ugrad or Rackham Grad	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk Number of Wks		Contact Hrs/Wk Number of Wks	
3 3		3 3 14	

Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s) ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading ☒ A-E ☐ CR/NC ☐ P/F ☐ S/U

Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Graded Section ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Approval Info ☐ Curriculum Comm. ☐ Faculty ☐ Cross listed Unit 1 ☐ Cross listed Unit 2

Approved by Name Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name Chair Signature

Home Dept. CLASP Mark Moldwin

Cross-listed Dept(s) Astronomy

Form Number

2633

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

Form Number **2750**

Date **12/21/2015**

Effective Term **Winter 2017**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	103
<input checked="" type="checkbox"/> Cross Listed Course Information	
Course Title	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description	
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq <input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions	
Level of Credit	Credit Hours Min Max
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work <input type="checkbox"/> Ugrad or Rackham Grad

B. REQUESTED LISTING

Home Department	Course Number
SPACE Space Science & Engineering	103
<input type="checkbox"/> Cross Listed Course Information	
Course Title	
TITLE ABBREVIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description	
<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
Degree Requirements <input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq <input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions	
Level of Credit	Credit Hours Min Max
<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work <input type="checkbox"/> Ugrad or Rackham Grad

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ☐ Yes ☒ No Max Hours? 3 Max Times? 1 Can it be repeated in the same term? ☐ Yes ☒ No

C. Class Type(s) ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Grading ☒ A-E ☐ CR/NC ☐ P/F ☐ S/U

Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Graded Section ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Approval Info ☐ Curriculum Comm.

Approved by Name \_\_\_\_\_ Approved Date \_\_\_\_\_

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name \_\_\_\_\_ Chair Signature \_\_\_\_\_

Home Dept. Climate & Meteorology

Cross-listed Dept(s) \_\_\_\_\_

Form Number

2750

SUPPORTING STATEMENT

103 Introduction to Space Weather is a general overview of the Earth's space environment for all majors. We will use and develop quantitative and critical thinking skills to understanding fundamental concepts of space science and how space weather impacts society and technology. The course will be alternatively taught by CoE and LSA faculty and will meet the LSA Natural Science requirements.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2695

Date 10/20/2015

Effective Term Winter 2016

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2695

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	204	SPACE Space Science & Engineering	204
<input checked="" type="checkbox"/> Cross Listed Course Information		<input type="checkbox"/> Cross Listed Course Information	
ASTRO Astronomy	204	ASTRO Astronomy	204
GEOSCI Geological Sciences	204	EARTH Earth and Envir Sci	204
Course Title		Course Title	
The Planets: Their Geology and Climates		The Planets: Their Geology and Climates	
TITLE ABBREVIATION		TITLE ABBREVIATION	
Time Sched Max = 19 Spaces		Time Sched Max = 19 Spaces	
Transcript Max = 20 Spaces		Transcript Max = 20 Spaces	
Course Description		Course Description for Official Publication (Max = 50 words)	
Structure, composition, and evolutionary history of the surfaces and atmospheres of the planets and their satellites, with special emphasis given to comparative aspects of geology and climatology. Intended for non-science majors with a background in high school math and science.		Structure, composition, and evolutionary history of the surfaces and atmospheres of the planets and their satellites, with special emphasis given to comparative aspects of geology and climatology. Intended for non-science majors with a background in high school math and science.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input type="radio"/> Degree Requirement <input checked="" type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq		Prereq	
<input type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work		<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/add'l Work	
Credit Hours		Credit Hours	
Min Max		Min Max	
Number of Wks		Number of Wks	
Contact Hrs/Wk		Contact Hrs/Wk	
3		3	
14		14	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No			
Max Hours? Max Times? Can it be repeated in the same term?			
<input type="radio"/> Yes <input type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Title	
Grading		Ann Arbor	
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U		Biological Station	
Camp Davis		Extension	
Course Is Y Graded <input type="checkbox"/>		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
Approval Info		Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm.		Department Chair Name	
Chair Signature		Chair Signature	
<input type="checkbox"/> Faculty		Home Dept. Climate & Space	
<input type="checkbox"/> Cross listed Unit 1		Cross-listed Astronomy	
<input type="checkbox"/> Cross listed Unit 2		Dept(s). Earth and Envir. Sci.	

SUPPORTING STATEMENT

Updated CARE in support of new department name change and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2677**

Date **10/14/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		477	
Cross Listed Course Information			
Course Title			
Space Weather Modeling			
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	TITLE ABBREVIATION	Time Sched Max = 19 Spaces
	Transcript Max = 20 Spaces		Transcript Max = 20 Spaces
Course Description		Course Description for Official Publication (Max = 50 words)	
		An introduction to a variety of models of the space environment, including models of the sun, magnetosphere, ring current, ionosphere, thermosphere and ionospheric electrodynamics. Students will learn the origins of different model, what each represents, to run the models and become familiar with the output.	
PROGRAM OUTCOMES:		PROGRAM OUTCOMES:	
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		<input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input checked="" type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k	
Degree Requirements		Degree Requirements	
<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq AOSS 370		Prereq SPACE 370; C or better	
<input type="radio"/> Enforced <input checked="" type="radio"/> Advised		<input checked="" type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit		Level of Credit	
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work <input type="checkbox"/> Ugrad or Rokhm Grad		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rokhm Grad <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rokhm Grad <input type="checkbox"/> Rokhm Grad w/adv'd Work <input type="checkbox"/> Ugrad or Rokhm Grad	
Credit Hours		Credit Hours	
Min Max		Min Max	
		4 4	
Contact Hrs/Wk		Contact Hrs/Wk	
Number of Wks		Number of Wks	
		4	
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable?			
<input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s)		Cognizant Faculty Member:	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		Aaron J. Ridley Associate Professor	
Grading		Title	
<input checked="" type="checkbox"/> A-E <input type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension			
Location		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind			
Course Is Y Graded <input type="checkbox"/>			
Approval Info		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
<input type="checkbox"/> Curriculum Comm. <input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Department Chair Name Climate & Space Cross-listed Dept(s):	
Approved by Name		Chair Signature	
Approved Date			

Form Number

2677

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2680

Date 10/14/2015

Effective Term Winter 2016

Action Requested

- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2680

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AOSS Atmos, Oceanic & Space Sci	495	SPACE Space Science & Engineering	495
Cross Listed Course Information		Cross Listed Course Information	
ENSCEN Environmental Sciences & Engin	495	ENSCEN Environmental Sciences & Engin	495
Course Title		Course Title	
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces
Course Description		Upper Atm & Ionosph	
		Upper Atm & Ionosph	
		Course Description for Official Publication (Max = 50 words)	
		Basic physical and chemical processes important in controlling the upper/middle atmosphere and ionosphere: photochemistry, convection, diffusion, wave activity, ionization, heating and cooling. The terrestrial, as well as planetary atmospheres and ionospheres are to be considered.	
PROGRAM OUTCOMES:	<input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j	PROGRAM OUTCOMES:	<input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input type="checkbox"/> e <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input type="checkbox"/> j
Degree Requirements	<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	Degree Requirements	<input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective
Prereq	AOSS 464	Prereq	SPACE 574
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised		<input type="radio"/> Enforced <input checked="" type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit	Credit Hours Min Max 3 3	Level of Credit	Credit Hours Min Max 4 4
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input checked="" type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input checked="" type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable?  
☐ Yes ☒ No Max Hours? Max Times? Can it be repeated in the same term? ☐ Yes ☒ No

Class Type(s)  
☒ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Grading  
☒ A-E ☐ CR/NC ☐ P/F ☐ S/U

Location  
☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Graded Section  
☒ Lec ☐ Sem ☐ Dis ☐ Other  
☐ Rec ☐ Lab ☐ Ind

Course Is Y Graded ☐

Cognizant Faculty Member: Title

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval Info  
☐ Curriculum Comm.

Approved by Name Approved Date

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Department Chair Name Chair Signature

Home Dept. Climate & Space

Cross-listed Dept(s): ENSCEN

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN – COLLEGE OF ENGINEERING  
Course Approval Request  
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number **2731**

Date **11/30/2015**

Effective Term **Winter 2016**

Course Offer Freq ☒ Indefinitely  
☐ One term only

Action Requested


- ☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

Complete the following sections:

- New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Course Number	
AOSS Atmos, Oceanic & Space Sci		499	
Cross Listed Course Information			
Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces		
Course Description			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
<b>Prereq</b> <input type="radio"/> Enforced <input type="radio"/> Advised			
<b>Credit Restrictions</b> Only 4 credits can be applied as a Technical Elective			
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		<b>Credit Hours</b> Min Max Contact Hrs/Wk Number of Wks	
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/adv'd Work		<b>Credit Hours</b> Min Max Contact Hrs/Wk Number of Wks	
<b>Repeatability (Indi Research, Dir. Study, Dissertation):</b> Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input checked="" type="radio"/> Yes <input type="radio"/> No			
<b>Class Type(s)</b> <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input type="checkbox"/> A-E <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> CR/NC <input type="checkbox"/> Biological Station <input type="checkbox"/> P/F <input type="checkbox"/> Camp Davis <input type="checkbox"/> S/U <input type="checkbox"/> Extension	
<b>Graded Section</b> <input type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Cognizant Faculty Member:</b> Title	
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty			
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		Submitted By: <input type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Approved by Name		Approved Date	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Department Chair Name Home Dept. Climate & Space Cross-listed Dept(s).	
		Chair Signature 	

Form Number  
2731

SUPPORTING STATEMENT

Updated CARE in support of new department name and new curriculum

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Date	11/20/2015
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Date	11/20/2015
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Course Offer Freq ☒ Indefinitely  
☐ One term only

2726

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Home Department <b>AOSS Atmos, Oceanic &amp; Space Sci</b> Cross Listed Course Information <b>AEROSP Aerospace Engineering</b>  Course Title  <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">TITLE ABREV- VIATION</td> <td style="width: 50%;">Time Sched Max = 19 Spaces Transcript Max = 20 Spaces</td> </tr> </table> Course Description	TITLE ABREV- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	Home Department <b>SPACE Space Science &amp; Engineering</b> Cross Listed Course Information <b>AEROSP Aerospace Engineering</b>  Course Title <b>Introduction to Space Physics</b>  <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">TITLE ABREV- VIATION</td> <td style="width: 50%;">Time Sched Max = 19 Spaces Transcript Max = 20 Spaces</td> </tr> </table> Course Description for Official Publication (Max = 50 words) A graduate level introduction to physical and aeronomical processes in the space environment. Discussion of theoretical tools, the Sun, solar wind, heliosphere, magnetosphere, ionosphere and the upper atmosphere. Spacecraft interaction with radiation, spacecraft-plasma interactions.	TITLE ABREV- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces												
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TITLE ABREV- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><b>PROGRAM OUTCOMES:</b></td> <td> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j         </td> </tr> </table> Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective Prereq <input type="radio"/> Enforced <input type="radio"/> Advised Credit Restrictions	<b>PROGRAM OUTCOMES:</b>	<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input checked="" type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><b>PROGRAM OUTCOMES:</b></td> <td> <input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k  <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j         </td> </tr> </table> Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input checked="" type="radio"/> Tech Elective Prereq Senior or Graduate Standing <input checked="" type="radio"/> Enforced <input type="radio"/> Advised Credit Restrictions	<b>PROGRAM OUTCOMES:</b>	<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j												
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<b>PROGRAM OUTCOMES:</b>	<input checked="" type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input checked="" type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input checked="" type="checkbox"/> j																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"><b>Level of Credit</b></td> <td style="width: 10%;">Credit Hours</td> <td style="width: 10%;">Contact Hrs/Wk</td> <td style="width: 50%;"></td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> <td> <input type="checkbox"/> All Credit types  <input type="checkbox"/> Rackham Grad w/addl Work         </td> <td>           Min Max            Number of Wks         </td> <td></td> </tr> </table>	<b>Level of Credit</b>	Credit Hours	Contact Hrs/Wk		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	Min Max Number of Wks		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"><b>Level of Credit</b></td> <td style="width: 10%;">Credit Hours</td> <td style="width: 10%;">Contact Hrs/Wk</td> <td style="width: 50%;"></td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only  <input type="checkbox"/> Rackham Grad  <input type="checkbox"/> Ugrad or Rackham Grad         </td> <td> <input type="checkbox"/> All Credit types  <input checked="" type="checkbox"/> Rackham Grad w/addl Work         </td> <td>           Min Max            Number of Wks         </td> <td>           4 4            13         </td> </tr> </table>	<b>Level of Credit</b>	Credit Hours	Contact Hrs/Wk		<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> All Credit types <input checked="" type="checkbox"/> Rackham Grad w/addl Work	Min Max Number of Wks	4 4 13
<b>Level of Credit</b>	Credit Hours	Contact Hrs/Wk															
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	<input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/addl Work	Min Max Number of Wks															
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Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?) <input type="radio"/> Yes <input checked="" type="radio"/> No Max Hours? Max Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No																	
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> P/F <input type="checkbox"/> S/U															
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension															
Course Is Y Graded <input type="checkbox"/>																	
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		<b>Approved by Name</b> <b>Approved Date</b>  															
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.  <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"><b>Department</b></td> <td style="width: 30%;"><b>Chair Name</b></td> <td style="width: 40%;"><b>Chair Signature</b></td> </tr> <tr> <td>Home Dept.</td> <td>Atmos, Oceanic &amp; Space Sci</td> <td></td> </tr> <tr> <td>Cross-listed</td> <td>Aerospace Engineering</td> <td></td> </tr> <tr> <td colspan="2">Dept(s)</td> <td></td> </tr> </table>		<b>Department</b>	<b>Chair Name</b>	<b>Chair Signature</b>	Home Dept.	Atmos, Oceanic & Space Sci		Cross-listed	Aerospace Engineering		Dept(s)				
<b>Department</b>	<b>Chair Name</b>	<b>Chair Signature</b>															
Home Dept.	Atmos, Oceanic & Space Sci																
Cross-listed	Aerospace Engineering																
Dept(s)																	

This revision is necessary because we are separating the undergraduates from the graduate students in this course. This will allow us to better focus on advanced concepts. We are revising an undergraduate course to cover this material at a lower level for our..... undergraduates.....

Detail the Special requirements

## College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number 2755

**Date** 10/20/2015

☐ New Course  
☒ Modification of Existing Course  
☐ Deletion of Course

New Courses - B & C completely  
Modifications - A modified information, B & C completely  
Deletions - A & C completely

Course Offer Freq ☒ Indefinitely  
☐ One term only

Form Number  
2706

### B. REQUESTED LISTING

Home Department	Course Number	Home Department	Course Number
AEROSP Aerospace Engineering	583	AEROSP Aerospace Engineering	583
<input checked="" type="checkbox"/> Cross Listed Course Information		Cross Listed Course Information	
AOSS Atmos, Oceanic & Space Sci		SPACE Space Science & Engineering	
583		583	
Course Title		Course Title	
TITLE ABBRE- VIATION Time Sched Max = 19 Spaces Transcript Max = 20 Spaces		TITLE ABBRE- VIATION Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	
Course Description		Management of Space Systems Design  Space Sys Des Mgt  Space Sys Des Mgt  Course Description for Official Publication (Max = 50 words)  Meets with Aero. Eng. 483 (Space System Design), or other senior design course when appropriate topic is chosen. Students in this course lead teams in high level project design of a space system. Modern methods of concurrent engineering manufacturing, marketing and finance, etc., are incorporated.	
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> c <input type="checkbox"/> e <input type="checkbox"/> g <input type="checkbox"/> i <input type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input type="checkbox"/> h <input type="checkbox"/> j		<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> e <input checked="" type="checkbox"/> g <input type="checkbox"/> i <input checked="" type="checkbox"/> k <input type="checkbox"/> b <input type="checkbox"/> d <input type="checkbox"/> f <input checked="" type="checkbox"/> h <input checked="" type="checkbox"/> j	
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective	
Prereq Aero/AOSS 582		Prereq AERO/SPACE 582; C or better	
<input checked="" type="radio"/> Enforced <input type="radio"/> Advised		<input checked="" type="radio"/> Enforced <input type="radio"/> Advised	
Credit Restrictions		Credit Restrictions	
<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Rackham Grad w/advd Work <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/advd Work		<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/advd Work	
Credit Hours Min Max		Credit Hours Min Max	
Contact Hrs/Wk Number of Wks Term		Contact Hrs/Wk Number of Wks Term	
Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?) <input type="radio"/> Yes <input type="radio"/> No		Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable?) <input type="radio"/> Yes <input type="radio"/> No	
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	
<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind		<b>Graded Section</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Dis <input type="checkbox"/> Other <input type="checkbox"/> Rec <input type="checkbox"/> Lab <input type="checkbox"/> Ind	
Course Is Y Graded <input type="checkbox"/>		Cognizant Faculty Member: _____ Title _____ _____ _____ _____ _____ Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	
<b>Approval Info</b> <input type="checkbox"/> Curriculum Comm.		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
Approved by Name _____ Approved Date _____		Department Chair Name _____ Chair Signature _____ Home Dept. Aerospace Cross-listed Climate & Space Dept(s). _____	
<input type="checkbox"/> Faculty <input type="checkbox"/> Cross listed Unit 1 <input type="checkbox"/> Cross listed Unit 2		Department Chair Name _____ Chair Signature _____ Home Dept. Aerospace Cross-listed Climate & Space Dept(s). _____	

Updated CARE in support of new department name change and new curriculum.

Updated CARF in support of new department name change and new curriculum.

**Detail the Special requirements**

The course will make extreme use of the computer Design Facility in Room 1008 FXB, and the AOSS CAEN Labs will initially be using the facilities in Room 2251 FXB.

