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

- 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 1st 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.
- 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	Х		
EECS	280	MOD	FT 2016	Х	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	х	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	х	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	Х	Presented by Tassos Perakis.	
NAVARCH	461	MOD	WT 2016	Х	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	
CLIIVIATE	102	IVIOD	112010		were APPROVED.	
CLIMATE	105	MOD	FT 2016	Х		
CLIMATE	171	MOD	FT 2016	Х		
CLIMATE	172	MOD	FT 2016	Х		
CLIMATE	280	MOD	FT 2016	Х		
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	Х		
CLIMATE	350	MOD	FT 2016	Х		
CLIMATE	370	MOD	FT 2016	Х		
CLIMATE	380	MOD	FT 2016	Х		
CLIMATE	381	MOD	FT 2016	Х		
CLIMATE	401	MOD	FT 2016	Х		
CLIMATE	405	MOD	FT 2016	Х		
CLIMATE	410	MOD	FT 2016	Х		
CLIMATE	411	MOD	FT 2016	Х		
CLIMATE	414	MOD	FT 2016	Х		
CLIMATE	422	MOD	FT 2016	Х		
CLIMATE	440	MOD	FT 2016	Х		
CLIMATE	441	MOD	FT 2016	Х		
CLIMATE	442	MOD	FT 2016	Х		
CLIMATE	451	MOD	FT 2016	Х		
CLIMATE	462	MOD	FT 2016	Х		
CLIMATE	466	MOD	FT 2016	Х		
CLIMATE	467	MOD	FT 2016	Х		
CLIMATE	474	MOD	FT 2016	Х		
CLIMATE	475	MOD	FT 2016	Х		
CLIMATE	476	MOD	FT 2016	Х		
CLIMATE	478	MOD	FT 2016	Х		
CLIMATE	480	MOD	FT 2016	X		

CLIMATE	498	MOD	FT 2016	Х		
CLIMATE	499	MOD	FT 2016	Х		
CLIMATE	501	MOD	FT 2016	Х		
CLIMATE	524	MOD	FT 2016	Х		
CLIMATE	551	MOD	FT 2016	Х		
CLIMATE	563	MOD	FT 2016	Х		
CLIMATE	564	MOD	FT 2016	Х		
CLIMATE	575	MOD	FT 2016	Х		
CLIMATE	576	MOD	FT 2016	Х		
CLIMATE	578	MOD	FT 2016	Х		
CLIMATE	591	MOD	FT 2016	Х		
CLIMATE	592	MOD	FT 2016	Х		
CLIMATE	605	MOD	FT 2016	Х		
CLIMATE	606	MOD	FT 2016	Х		
CLIMATE	651	MOD	FT 2016	Х		
CLIMATE	747	MOD	FT 2016	Х		
CLIMATE	749	MOD	FT 2016	Х		
SPACE	101	MOD	FT 2016	Х		
SPACE	103	MOD	WT 2017	Х		
SPACE	204	MOD	FT 2016	Х		
SPACE	477	MOD	FT 2016	Х		
SPACE	495	MOD	FT 2016	Х		
SPACE	499	MOD	FT 2016	Х		
SPACE	574	MOD	FT 2016	Х	Note that signed version on file is not yet signed by AERO.	
SPACE	583	MOD	FT 2016	Х		
SPACE	598	MOD	FT 2016	Х		
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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
- Recap of Dec. 1st meeting. Approval of mtg. minutes? (Page 4-6)
- Modification to SUGS program. Change to application deadlines to SUGS for CSE students. Program change. (Page 7-9)
- 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	499	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 17th 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 12th 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 Regrading CARFs	TABLED
MECHENG	489	NEW	WT 2016	Х	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	х	Presented by Jamie Phillips. Course is intended for	
			(UPDATED		graduate/doctorate students. Credit for only one: EECS 504 or	
			TO FT 2016)		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	Х	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	

		1		1	Graduate Standing Postricting courses to students with 94	
					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	
LIVIN	320	INEVV	W1 2010	^	RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	530	NEW	WT 2016	Х	Presented by Mikhail Zolikoff. (UPDATED FORM ALREADY	
LIVIK	330	INEVV	W1 2010	^	RECEIVED FOR PROCESSING AS OF 12/3/15 AD)	
ENTR	540	NEW	WT 2016	х	Presented by Mikhail Zolikoff. Committee discussed that the	
2.00	3.0	1,121,1	10.2020		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			Х
CLIMATE	105	MOD	WT 2016			Х
CLIMATE	171	MOD	WT 2016			Х
CLIMATE	172	MOD	WT 2016			Х
CLIMATE	280	MOD	WT 2016			Х
CLIMATE	320	MOD	WT 2016			Х
CLIMATE	321	MOD	WT 2016			Х
CLIMATE	323	MOD	WT 2016			Х
CLIMATE	350	MOD	WT 2016			Х
CLIMATE	370	MOD	WT 2016			Х
CLIMATE	380	MOD	WT 2016			Х
CLIMATE	381	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	Х
CLIMATE	401	MOD	WT 2016			Х
CLIMATE	405	MOD	WT 2016			Х
CLIMATE	410	MOD	WT 2016			Х
CLIMATE	411	MOD	WT 2016			Х
CLIMATE	414	MOD	WT 2016			Х
CLIMATE	422	MOD	WT 2016			Х
CLIMATE	440	MOD	WT 2016			Х
CLIMATE	441	MOD	WT 2016			Х
CLIMATE	442	MOD	WT 2016		Update form - min. grade for enforced prereq. needed	Х
CLIMATE	451	MOD	WT 2016			Х
CLIMATE	462	MOD	WT 2016			Х
CLIMATE	466	MOD	WT 2016			Х
CLIMATE	467	MOD	WT 2016			Х
CLIMATE	474	MOD	WT 2016			Х
CLIMATE	475	MOD	WT 2016			Х
CLIMATE	476	MOD	WT 2016			Х
CLIMATE	478	MOD	WT 2016			Х
CLIMATE	480	MOD	WT 2016			X
CLIMATE	498	MOD	WT 2016			Х
CLIMATE	499	MOD	WT 2016		Directed study not to be cross-listed. Original form	Х
					submitted. Did not receive an updated form. Currently, this	
			1	i .	1	

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



MEMORANDUM

TO:

COE Curriculum Committee

FROM:

John 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.

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/

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 <u>must</u> complete the BS(E) degree prior to enrollment in the SUGS Masters Program.

CONTACTS:

CSE Graduate Programs Office, 3909 Beyster Bldg. <u>csegrad@eecs.umich.edu</u> 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

Course Broakdown					
Requirement	Credits				
Design course	3				
Cornerstone class	3				
Supporting coursework	3				
Total	9				

How to declare Program in Global Health Design

To declare PGHD, send an email to <u>globalhealthdesign@umich.edu</u> 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.

Advising and Oversight

Program Director: Professor Kathleen Sienko; sienko@umich.edu

Program Advisor: Maria Young; 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. 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. 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.

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

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

³ 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)
 - o 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 socially engaged design @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 sociallyengagedddesign@umich.edu.

Advising and Oversight

Program Directors: Professor Shanna Daly (srdaly@umich.edu), Professor Kathleen Sienko (sienko@umich.edu), Professor Steve Skerlos (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)

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.

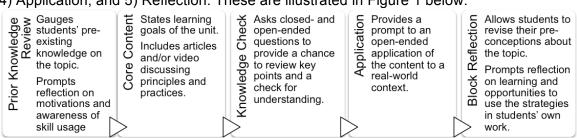


Figure 1. Learning Block Model and Goals

<u>Prior Knowledge Review:</u> 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 openended 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**

Form Number

2692

College Curriculum Committee, 1420 Lurie Engineering Center Building Action Requested

Date

10/19/2015

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O New Course
O Modification of Existing Course
O 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

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

College Curriculum Committee, 1420 Lurie Engineering Center Building

2533 **Form Number**

12/01/2015 **Date**

Fall 2016

Action Requested

O New Course

Modification of Existing CourseDeletion 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

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Х	Lec □ Rec □	☐ Sem ☐ Dis ☐ (X Lab ☐ Ind			Ann Arbor Biological Station	Georg E	Essl genberg				Asst P		
	Graded	Section		P/F	Camp Davis Extension	Jeli Hill	genberg				Lec IV		
		☐ Sem ☐ Dis ☐ 0	Other	Course Is Y G			Course: Atta a regular gi		mination if Cogniz te faculty	ant Fac	culty		
	Approv	/al Info	Approved by	Name	Approved Date				By: 🛛 Home De	ept. 🗖	Cross-	listed De	ept.
		riculum Comm.				_	Den	artme	ent Chair Name	e	Chair 9	Signatu	ıre
	Fac					Home D	•			-			-
		ss listed Unit 1 .ss listed Unit 2				— Cross-							

Dept(s)
Form Number
2533
SUPPORTING STATEMENT
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.
re any special resources or facilities required for this course? ☐ Yes ☒ No
Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING

College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number Course Approval Request

Action Requested

O New Course Modification of Existing CourseDeletion of Course

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

12/1/2015 **Date** Effective Term Fall 2016

2736

Course Offer Frea ☐ Indefinitely

	A. CUF	RENT LISTING				B. REG	QUESTED	LISTING	o	☐ One te	rm only
	Home D	epartment			Course Number	Home De	partment				Course Number
						EECS E	Elec Engi	n & Compute	r Sci		281
	Cross List	ed Course Information	on			Cross Lis	ted Course	Information			
	Course Ti	tle				Course 7	itle				
						Data Str	uctures an	nd Algorithms			
	TITLE	Time Sched Max = 19 Spaces				TITLE	Time Sch		c & Alg		
	ABBRE- VIATION	Transcript Max = 20 Spaces				ABBRE- VIATION	Transcript Max = 20 Sp	Data Str A	lg		
¬	Course D	•	l			Course D		or Official Publica	ation (Max	c = 50 words	s)
						structures binary tre sorting al introduct	s including es, search t gorithms; r ion to greed	rithm analysis an lists, stacks, quer rees, balanced tr ecursive algorith ly algorithms an g assignments.	ues, priori ees, and g ms; basic	ity queues, l graphs; searc graph algor	nash tables, hing and rithms;
	PROG OUTCO	MES: b d	e e g d f h Requirement C	□ j	Э	OUTC		X a X c X D b □ d □ Degree Require Core Course	ement O		ive
	Prereq	EECS 203 and E		Other		Prereg	_	203 or Math 46	-		FFCS 280
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_	Credit Restrictions					Credit Restrictions		an 2 previous ele d [No credit in El			
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C.	Repeatal	oility (Indi Research,	Dir. Study, Dis	sertation: Is t	his course repeata	able? ⊙ N		Max ? Times?			peated O Yes term? No
	Class T			aamig	cation	Cogniz H V Jag		ty Member:		Title	
X	Rec	☐ Sem ☐ Dis ☐ X Lab ☐ Ind			Ann Arbor Biological Station	- v Jag	uiSII			Prof.	
	Graded	Section			Camp Davis Extension					_	
	X Lec ☐ Rec		Other	Course Is Y G	_			ch nomination if	Cognizan	t Faculty	
		val Info riculum Comm.	Approved by		Approved Dat		Subr	mitted By: X H			listed Dept.
	☐ Fac	ulty ss listed Unit 1				Home D	•	artinent Chan			
		ss listed Unit 2				— Cross-	listed				

Dont(s)			
Dept(s).			
		Form Nun	nber
		2736	
SUPPORTING STATEMENT			
EECS 280 instructors have been using a lab style format in discussion se found it to be a much better way to teach programming than a discussion class. They receive a worksheet of programming exercises that are prep Instructors and GSIs help students with problems they may encounter. It approach. Some students (especially those who have not programmed begin a programming project. In a lab they learn the correct way to design instake among beginning programmers is that they write an entire prograto debug when it does not work. In lab sections, they learn to develop incored.	format Students aratory to the nex There are several before) have a diffinant for the project am for the project are format.	bring their t project as advantage cult time k ograms A and then h	Laptops to ssignment s to this nowing how to very common ave no idea how
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Are any special resources or facilities required for this course?	No		
Detail the Special requirements			

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

College Curriculum Committee, 1420 Lurie Engineering Center Building

2738 **Form Number**

12/2/2015 **Date**

Action	Requested
ACHOIL	neduesied

O New Course

Modification of Existing CourseDeletion 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

	20.01.01.0 71 d. 0 00.11.p10.10.1,	Course Offer Freq ☐ Indefinitely ☐ One term only
	A. CURRENT LISTING	B. REQUESTED LISTING
	Home Department Course Number	Home Department Course Number
	EECS Elec Engin & Computer Sci 595	EECS Elec Engin & Computer Sci 595
\Box	Cross Listed Course Information	Cross Listed Course Information
		LING Linguistics 541
		SI Information 561
_	Occurs Tilds	Occurs Tills
	Course Title	Course Title
	Time Sched	Natural Language Processing Time Sched Natural Lang Proc
	ABBRE- Max = 19 Spaces	ABBRE- Max = 19 Spaces Natural Lang 1 10C
	VIATION Transcript Max = 20 Spaces	VIATION Transcript Natural Lang Proc
Х	Course Description	Course Description for Official Publication (Max = 50 words)
	Course is an introduction to computational and linguistic concepts and techniques for modeling and analyzing	Linguistic fundamentals of natural language processing (NLP), part of speech tagging, hidden Markov models,
	natural language. Topics include finite-state machines, part	syntax and parsing, lexical semantics, compositional
	of speech tagging, context-free grammars, syntax and parsing, unification grammars and unification-based	semantics, word sense disambiguation, machine translation. Additional topics such as sentiment analysis,
	parsing, language and complexity, semantics, discourse	text generation, and deep learning for NLP.
	and dialogue modeling, natural language generation, and	
	machine translation.	
	PROGRAM a c e g i k OUTCOMES: b d f h j	PROGRAM a c e g i k b d f h j
	Degree O Degree Requirement O Tech Elective Requirements O Core Course O Other	Degree
	Prereq Senior standing	Prereq Senior standing
Х	Enforced Advised	O Enforced O Advised
	Credit	Credit
	Restrictions Level of Credit	Restrictions
	Level of Credit Undergrad only Ugrad or Non-Rickhm Grad Credit Hours Hrs/Wk	☐ Undergrad only ☐ Ugrad or Non-Rickhm Grad ☐ Credit Hours ☐ Hrs/Wk 3
Х	☐ Rackham Grad ☐ All Credit types MIN MAX X Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work Number	□ Rackham Grad
	W Ugrad or Rickhm Grad of Wks	Yes May Can it be repeated Ves
C.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata	ible? No Hours? Times? in the same term? No
	Class Type(s) Grading Location	Cognizant Faculty Member: Title
	X Lec □ Sem □ Dis □ Other □ A-E X Ann Arbor □ Rec □ Lab □ Ind □ CR/NC □ Biological Station	Dragomir Radev Prof.
	Creded Section P/F Camp Davis	
	S/U Extension ✓ Lec ☐ Sem ☐ Dis ☐ Other	Grad Course: Attach nomination if Cognizant Faculty
	☐ Rec ☐ Lab ☐ Ind Course Is Y Graded ☐	is not a regular graduate faculty
	Approval Info Approved by Name Approved Date	Submitted By: Mark Home Dept. Cross-listed Dept.
	☑ Curriculum Comm.	Department Chair Name Chair Signature
	☐ Faculty ☐ Cross listed Unit 1	Home Dept. EECS
	☐ Cross listed Unit 2	- Cross-listed Linguistics
	<u> </u>	— OTO33-II3(EU

Dept(s)	SI	

Form Number

2738

SUPPORTING STATEMENT	
The description reflects changes occurring in the field since old	description was written.
Are any special resources or facilities required for this course?	☐ Yes ☐ No
Detail the Special requirements	

THE UNIVERSITY OF MICHIGAN COLLEGE (Course Approval Reques	
College Curriculum Committee, 1420 Lurie Engine	
Action Requested New Course Modification of Existing Course Complete the following section New Courses - B & C completely	ns:
O Deletion of Course Modifications - A modified inform Deletions - A & C completely	Course Offer Freq Indefinitely One term only
A. CURRENT LISTING	B. REQUESTED LISTING
Home Department Course Number	
	NAVARCH Naval Arch & Marine Engin 280
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title
	Introduction to Probability for Marine Engineers
TITLE Time Sched Max = 19 Spaces	TITLE Time Sched Max = 19 Spaces Prob Marine Eng
VIATION Transcript Max = 20 Spaces	VIATION Transcript Prob Marine Eng
Course Description	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.
PROGRAM a c e g i k OUTCOMES: b d f h j Degree Requirements O Free Elective O Other Requirements O Core Course O Tech Elective	PROGRAM OUTCOMES: b
OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective Prereq Math 116	OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Othe Requirements © Core Course O Tech Elective Prereq Math 116
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OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective Prereq Math 116 Enforced O Advised O Adv	OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Othe Requirements © Core Course O Tech Elective Prereq Math 116 Denforced Advised Credit Restrictions Level of Credit Restrictions Level of Credit All Credit types Rackham Grad All Credit types Rackham Grad Non-Rckhm Grad All Credit types Rackham Grad Non-Rokhm Grad All Credit types Rackham Grad Non-Rokhm Gr
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2749

Enforced prerequisites inadvertently excluded transfer studentsP	Please change to advisory.

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e any special resources or facilities required for this course	e? Yes No
Detail the Special requirements	

		to the state of th	proval Request				Form Number	14/10	
	College Cur Action Requested	rriculum Committee, 142	20 Lurie Engineerir	ng Center I	Building		Date	12/16/20	15
	New Course	Complete the follo	owing sections:					Maria de la composição	
	Modification of Existing Course	New Courses - B &	C completely				Effective Term	Winter 2	016
	O Deletion of Course	Modifications - A m		on, B & C	complet			n 🛛 Indefi	nitoly
	A. CURRENT LISTING	Deletions - A & C	completely	B. RE	QUESTE		Course Offer Free STING	One t	
	Home Department		Course Number	Home De	partment				Course Number
	NAVARCH Naval Arch & Ma	rine Engin	461	NAVAF	CH Nav	/al Ar	ch & Marine En	ain	461
h	Cross Listed Course Information			100	ted Cours	- N. S.		3	
•				MFG M	anufactı	uring			462
1	Course Title			Course ⁻				1	-
1				Marine	1		onstruction		
	TITLE Time Sched Max = 19 Spaces			TITLE ABBRE-	Time So Max = 19		MarStructureCor	nst	
	VIATION Transcript Max = 20 Spaces			VIATION	Transcr Max = 20		MarStructureCor	nst	
1	Course Description			Course D			ficial Publication (M	ax = 50 word	s)
				assemb mechai	oly, majo nical inte ional ac	or ma eracti	cations of modu nufacturing prod ons and contribe cy, accuracy cor	cesses, the utions to qu	ermo- uality and
		e g i g f h j	k ve O Other		GRAM OMES:		a c e b d f gree Requirement	g i h j O Free Elec	k Other
	Requirements O Core Course	O Tech Electiv	ve			A SECTION AND ADDRESS.	re Course	O Tech Elec	ctive
(Prereq NA 260, NA 310 © Enforced O Advised			Prereq O Enforce O Advise		0, NA :	310		
_	Credit		MENS FAR	Credit					
	Restrictions Level of Credit		Contact	Restrictions	Level of	f Cred	it		Control
]	Undergrad only Ugrad or Non-Rck Rackham Grad All Credit types Non-Rckhm Grad Rckhm Grad w/ad Ugrad or Rckhm Grad	chm Grad Credit Hours Min Max	Contact Hrs/Wk Number of Wks	☐ Undergra☐ Rackham☐ Non-Rck ☑ Ugrad or	d only Grad	Ugra	ad or Non-Rckhm Grad Credit types hm Grad w/add'l Work	Credit Hours Min Max 3 3	Contact Hrs/Wk 3 Number of Wks 14
	Repeatability (Indi Research, Dir. S	Study, Dissertation: Is t	this course repeata	. 01	lo Hour	s?	Max Times?	Can it be re in the same	AND SHOULD SEE THE SECOND
]	Class Type(s) X Lec Sem Dis Oth Rec Lab Ind Graded Section	er 🔀 A-E 🔀 CR/NC P/F	Ann Arbor Biological Station Camp Davis	Dong	zant Fac	ulty M	lember:	Title Profes	sor
	□ Lec □ Sem □ Dis □ Oth □ Rec □ Lab □ Ind	er S/U Course Is Y G	Extension raded	A STATE OF THE PARTY.			omination if Cognizate faculty	^	
	Curriculum Comm.	proved by Name	Approved Date	_	De		ent Chair Name		listed Dept.
	☐ Faculty ☐ Cross listed Unit 1			_ Home [-	- 2	ch & Marine Engi		h
	Cross listed Unit 1			- Cross	listed	nutac	turing	8	m
				_ De	ept(s).				

Form	Number
2	748

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?
Detail the Special requirements

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

Column C	List of Courses with ONLY Change to Program Designation and/or Program Designation in a Prered to Course	NEW SUBJ	ECTS
AUSS 102 (FARTH 122) (FANDRON 102), Extreme Weather		-	SPACE
AUSS 1019, INTO Space Weather	AOSS 101 (ASTRO 183). Rocket Science		Х
AUGS 105 (GHEM 105) (EMSCEN 105) (ENVIRON 105). Our Changing Almosphere X AUGS 110. Gimlar end Space Setience and Engineering seminar X AUGS 117. (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 110) (EARTH 171). Introduction to Global Change-Part I X AUGS 172 (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 172 (BIOL 101) (Univ Course 110) (ENSCEN 171) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 172 (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 200 (GBABH 1712) (SOC 171) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 201 (GBABTH 2014) (Fall 1712) (Soc 171) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 201 (GBABTH 2014) (Fall 1712) (Soc 1712) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II X AUGS 201 (GBABTH 2014) (Fall 1712) (Soc 1712) (GBABTH 2014) (GBABT	AOSS 102 (EARTH 122) (ENVIRON 102). Extreme Weather	Х	
X0SS 110. Climate and Space Science and Engineering Seminar X X X0SS 171. (Biol. 1 (Min Course 11) (FASCH 171) (EMSCN	AOSS 103. Intro Space Weather		Х
ACCESS 172 (BION. 1010) (Univ. Course 1.10) (ENSTEN 172) (ENVISION 110) (EARTH 171), Introduction to Global Change-Part II	AOSS 105 (CHEM 105) (ENSCEN 105) (ENVIRON 105). Our Changing Atmosphere	Х	
XOSS 172 (Clim's Course 111) (EARTH LT2P) (EMSCEN 172) (ENVIRON 1111) (SOC 111). Introduction to Global Changes Part II X XOSS 2014 (ASTRO 204) (EARTH 204). The Blanets: Intel' Geology and Climates X XOSS 2016 (ASTRO 204) (EARTH 2014). The Blanets: Intel' Geology and Climates X XOSS 3010 (Slobal Perinorment Integral of Technological Change X XOSS 3010 (Slobal Perinorment Integral of Technological Change X XOSS 3010 (Slobal Perinorment Integral of Technology) X XOSS 4017 (Mathematical Nethrods in Geophysics X XOSS 4017 (Mathematical Nethrods in Geophysics X XOSS 4017 (Mathematical Nethrods in Geophysics) X XOSS 4	AOSS 110. Climate and Space Science and Engineering Seminar	Х	Х
XOSS 2016, IGATRO 2049 (FaRTH 2041. The Planets: Their Geology and Climates X XOSS 505, Machine this of Science X XOSS 505, Machine this of Science X XOSS 301, Gliabal Environment Impact of Technological Change X XOSS 321 (EARTH 2312, Earth System Analysis X XOSS 321 (EARTH 270), Solar Terrestrial Relations X XOSS 401. (EARTH 2019). Earth Modeling X XOSS 402, Machine Terrestrial Relations X XOSS 402. (EARTH 412). Cool and Precipitation Processes X XOSS 410. (EARTH 412). Cool and Precipitation Processes X XOSS 412. (EARTH 412). Wealther Systems X XOSS 412. (EARTH 412). Roundary Layer Metarology X XOSS 412. (EARTH 414). Wealther Systems X XOSS 412. (EARTH 414). Roundary Layer Metarology X XOSS 412. (EARTH 414). Roundary Layer Metarology <td< td=""><td>AOSS 171 (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 110) (EARTH 171). Introduction to Global Change-Part I</td><td>Х</td><td></td></td<>	AOSS 171 (BIOL 110) (Univ Course 110) (ENSCEN 171) (ENVIRON 110) (EARTH 171). Introduction to Global Change-Part I	Х	
X X X X X X X X X X	AOSS 172 (Univ Course 111) (EARTH 172) (ENSCEN 172) (ENVIRON 111) (SOC 111). Introduction to Global Change-Part II	X	
ACCESS 100, Global Environment Impact of Technological Change	AOSS 204 (ASTRO 204) (EARTH 204). The Planets: Their Geology and Climates		Х
AUGS 532 (FARTH 232). Farth System Analysis X X AUGS 537 (FARTH 232). Board Prescriptal Relations X X AUGS 540 (FARTH 232). Bourdary strain Relations X X AUGS 541 (FARTH 405). Earth Modeling X X AUGS 541 (FARTH 419). Westher Systems X X AUGS 541 (FARTH 141). Gloud and Precipitation Processes X X AUGS 541 (FARTH 419). Westher Systems X X AUGS 541 (FERTH 23). Boundary Layer Meteorology X X AUGS 541 (FERTH 419). Meteorology and Climate of the Rockles X X AUGS 540 (FERTH 442). Queenic Dynamics I X X AUGS 540 (FERTH 442). Queenic Dynamics I X X AUGS 540 (FERTH 442). Queenic Dynamics I X X AUGS 540 (FERTH 543). Farth A19 (FERTH 543). Amospheric Dynamics I X X AUGS 540 (FERTH 543). Farth A19 (FERTH 543). Amospheric Dynamics I X X AUGS 540 (FERTH 463). Represent and Space Sciences X X AUGS 540 (FERTH 463). Represent and Space Sciences X X AUGS 546 (FERTH 543). Amospheric And Space Sciences	AOSS 205. Mathematics of Rocket Science		Х
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AOSS 590. Space Systems Projects X	AOSS 588. Regional Scale Climate		Х
	AOSS 589. The Art of Climate Modeling		X
AOSS 595 (EECS 518). Magnetosphere and Solar Wind X	AOSS 590. Space Systems Projects		Х
	AOSS 595 (EECS 518). Magnetosphere and Solar Wind		X

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

Courses Where Course Descriptions Are Changing

	NEW SUB	JECTS
	CLIMATE	SPACE
AOSS 280. Undergraduate Research Experience	X	Х
AOSS 320 (EARTH 320). Earth System Evolution	X	Х
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	Х
AOSS 592. Climate Practicum II	X	Х
AOSS 605. Current Topics in Atmospheric, Oceanic and Space Sciences	X	Х
AOSS 747. AOSS Student Seminar	Х	Х
AOSS 749. Atmospheric and Space Science Seminar	х	Х

Courses Where Course Title is Changing

	NEW SUE	SJECTS
	CLIMATI	SPACE
AOSS 320 (EARTH 320). Earth System Evolution	X	Х
AOSS 321 (EARTH 321). Earth System Dynamics	X	Х
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	Х
AOSS 592. Climate Practicum II	X	Х
AOSS 605. Current Topics in Atmospheric, Oceanic and Space Sciences	X	Х
AOSS 747. AOSS Student Seminar	X	Х
AOSS 749. Atmospheric and Space Science Seminar	х	Х

Courses Where Course Credits Are Changing

4 Credits to 3 Credits	NEW SUBJECTS		
	CLIMATE	SPACE	
AOSS 320 (EARTH 320). Earth System Evolution	Х	Х	
AOSS 321 (EARTH 321). Earth System Dynamics	Х	Х	
AOSS 350 (EARTH 350). Atmospheric Thermodynamics	Х	Х	
AOSS 380 (EARTH 381). Introduction to Atmospheric Radiation	Х	Х	
AOSS 401 (EARTH 401). Geophysical Fluid Dynamics	Х		

Courses Where Both Course Description and Course Credits Are Changing

	NEW SUBJ	ECTS
	CLIMATE	SPACE
AOSS 320 (EARTH 320). Earth System Evolution	Х	Х
AOSS 321 (EARTH 321). Earth System Dynamics	Х	Х

		THE	UNIVERSITY	OF MICHIGAN Course Appro		ENGINEE	RING	Form Number	2632	
	Action R	Colleg equested	je Curriculum (Committee, 1420 I	Lurie Engineeri	ng Center E	Building	Date	8/5/2015	
	O New C	ourse		olete the follow Courses - B & C		:		Effective Term	Winter 2016	<u> </u>
		cation of Existing Co on of Course		ications - A mod		ion, B & C	completely	Effective Term	_	
			Deleti	ons - A & C cor	mpletely			Course Offer Freq		
		RENT LISTING					QUESTED L	ISTING		
		epartment			ourse Number	Home De				ourse Number
_		tmos, Oceanic &		İ	102			& Meteorology		102
Х		ed Course Information	on		100		ted Course In	formation		100
	GEOSC ENVIRO	-			122 102	EARTH ENVIRO	NI			122 102
	LIVIICO	14			102		714			102
П	Course Ti	tle				Course T				
ш		Time Sched	1			Extreme	Weather Time Sched	1		
	TITLE ABBRE	Max = 19 Spaces Transcript	Extreme We			TITLE ABBRE-	Max = 19 Spac			
	VIATION Course D	Max = 20 Spaces	Extreme We	eather		VIATION COURSE D	Max = 20 Space	Extreme Weather Official Publication (Ma	v = 50 words)	
	Course Di	escription				ı		les an introduction		cics of
								events. The cours		
								s, jet stream, floor		
								ning, thunder, hai ate the physical la		
								icipants apply the		
						on storr	n forecasti	ing and weather a	nalysis assig	ınments.
	PROG OUTCO		c e c	g □i □k h □j		PROG OUTC]g	k
	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree Require		Degree Requirement (Core Course (Free Elective Tech Elective	
_	Prereq O Enforce	ad.				Prereq O Enforce	d			
Щ	O Advised					O Advised				
П	Credit Restrictions					Credit Restrictions				
		Level of Credit			ontact rs/Wk 3		Level of Cre		Credit Hours	ontact
\Box	Undergrad	d only ☐ Ugrad or N Grad ☐ All Credit t m Grad ☐ Rckhm Gra	lon-Rckhm Grad ypes ad w/add'l Work	Min Max	lumbor	Undergrade Rackham Non-Rckh	d only U Grad D A m Grad D R	Igrad or Non-Rckhm Grad II Credit types ckhm Grad w/add'l Work	Min Max N	lrs/Wk 3 umber
Ш.	Ugrad or F	Rckhm Grad		3 3 0	f Wks 14	Ugrad or I	Rckhm Grad			Wks 14
C.		pility (Indi Research,	Dir. Study, Dis			able? 🍝 N	O Hours?	Max Times?	Can it be repea in the same ter	
$\overline{}$	Class T	ype(s) Sem Dis	¬	rading Locati	ion ın Arbor	Cogniz	ant Faculty	Member:	Title	
ш	Rec		Ë	CR/NC Bio	ological Station	-				
		Section			amp Davis tension					
		Sem Dis Lab Ind	Other	Course Is Y Grad	_		ourse: Attach a regular grad	nomination if Cognizat	nt Faculty	
		val Info	Approved by		Approved Date			ted By: X Home Dep	ot. Cross-lis	ted Dept.
		rriculum Comm.					Denor	ment Chair Name	Chair Sig	ınature
	☐ Fac	Stullty.				Home D	1	e & Space Mark Mol		mature
		suity oss listed Unit 1					Earth (and Envir Sci		
		ss listed Unit 2				Cross- De		nmental Sciences &	Engin	

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Form Number

2632

UPPORTING STATEMENT		
Updated CARF in support of new department name change and new curricula	.m	
re any special resources or facilities required for this course?	es 🔀 No	
, . ,	<u>A</u>	
Detail the Special requirements		

	THE UNIVE	RSITY OF MICHIGAN Course Appro		ENGINEERING	Form Number	2634
		riculum Committee, 1420		ng Center Buildir	ng Date	8/5/2015
	Action Requested New Course	Complete the follow	ing sections:		Duto	
	 Modification of Existing Course 	New Courses - B & C			Effective Term	Winter 2016
	O Deletion of Course	Modifications - A mod Deletions - A & C cor		on, B & C com	Course Offer Freq	☑ Indefinitely
	A. CURRENT LISTING	Deletions // a o col	inplotory	B. REQUE	STED LISTING	One term only
	Home Department	Co	ourse Number	Home Departm		Course Number
	AOSS Atmos, Oceanic & Spa	ace Sci	105		limate & Meteorology	105
Х	Cross Listed Course Information		100		ourse Information	100
\Box	Chemistry		105	Chemistry	outoo momaaon	105
	ENSCEN		105	,	nvironmental Sciences &	
				ENVIRON		105
П	Course Title			Course Title		
ш	Time Sched				g Atmosphere	
	TITLE Max = 19 Spaces ABBRE-			ABBRE- Max	me Sched = 19 Spaces Changing Atmosp	here
	VIATION Transcript Max = 20 Spaces			Max	anscript = 20 Spaces Changing Atmosp	
	Course Description				otion for Official Publication (Ma	•
					of the greenhouse effect, str lar ozone holes, and urban s	
					sible consequences are disc	
					d behavior of the atmospher	e and its components of
				the environm	ent.	
					_	
		e g li k		PROGRAI OUTCOME		g ∏i ∏k h ⊠j
		f h j ement O Free Elective	O Other	Degree	O Degree Requirement	
	Requirements O Core Course	O Tech Elective	Other	Requiremen		Tech Elective Other
_	Prereq O Enforced			Prereq O Enforced		
Ш	O Advised			O Advised		
$\overline{}$	Credit Restrictions			Credit Restrictions		
ш	Level of Credit		ontact		el of Credit	Contact
_	Undergrad only Ugrad or Non-Rckh Rackham Grad All Credit types Non-Rckhm Grad Rckhm Grad w/add	om Grad Credit Hours H	rs/Wk	Undergrad only Rackham Grad		Fredit Hours Hrs/Wk 3
Ш	Rackham Grad All Credit types Non-Rckhm Grad Rckhm Grad w/add	/I Work	Number of Wks	Rackham Grad Non-Rckhm Grad Ugrad or Rckhm	d Rokhm Gråd w/add'l Work Grad	3 Number of Wks 13
	Repeatability (Indi Research, Dir. St	tudy. Dissertation: Is this	course repeata	O Yes		Can it be repeated Yes
C.		*	· ·	● NO F		in the same term? ONo
	Class Type(s) X Lec Sem Dis Othe	Grading Locat er — ⊠ A-E ⊠ Ar	n Arbor	Perry Samso	Faculty Member:	Title Professor
ш	Rec Lab Ind	CR/NC Bi	ological Station	1 ony ounisc	, i	1 10103301
	Graded Section		amp Davis			
	X Lec Sem Dis Other				e: Attach nomination if Cognizar	nt Faculty
					ular graduate faculty Submitted By: Home Dep	t. Cross-listed Dept
	Approval Info Appr Curriculum Comm.	oroc by Humo	pprovou Date	<i>-</i> 	·	
				_	Department Chair Name	Chair Signature
	Faculty				Climate & Space	
	☐ Cross listed Unit 1 ☐ Cross listed Unit 2			Cross-listed	Environment Chemistry	+
				Dept(s).	Chemistry Environmental Sciences &	
	i e					O-l.,

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Form Number

2634

SUPPORTING STATEMENT		
Updated CARE in support of new department name change and new cu	ırriculum.	
-1		
Are any special resources or facilities required for this course?	☐ Yes 🔀 No	
Detail the Special requirements		
the state of the s		

	THE	UNIVERSITY OF MICHIGAN Course Appro		ENGINEER	RING	Form Number	2693	
		e Curriculum Committee, 1420	Lurie Engineerir	ng Center B	Building	Date	10/20/2015	
	Action Requested	Complete the follow	ina sections:			Dute	10/20/2010	
	New Course Modification of Existing Course	Now Courses D 9 C				Effective Term	Winter 2016	
	O Deletion of Course	Modifications - A mod		on, B & C			M Indofinitaly	_
		Deletions - A & C cor	mpletely			Course Offer Freq	Indefinitely □ One term or	alv
	A. CURRENT LISTING			B. REC	QUESTED L	ISTING		"y
	Home Department	Co	ourse Number	Home Dep	partment		Cours	e Number
	AOSS Atmos, Oceanic 8	Space Sci	171	CLIMAT	E Climate	& Meteorology	17	1
Х	Cross Listed Course Information	n		Cross List	ed Course Inf	ormation		
_	UC		110	UC			11	0
	Biology		110	Biology			11	0
	SNRE		110	EARTH	Earth and E	Envir Sci	17	1
	Geol Sci		171					
	Course Title			Course T	ïtle			
Ш		1		Introduct	ion to Global	Change		
	TITLE Time Sched Max = 19 Spaces			TITLE	Time Sched Max = 19 Space	s Intro Global Chng	I	
	ABBRE- VIATION Transcript Max = 20 Spaces			ABBRE- · VIATION		Global Chng		
_	Course Description			Course De		Official Publication (Ma	x = 50 words)	
Ш				l		der the evolution of		Earth
				and its e	nvironments	and the evolution of	f living organism	s.
						given to fundamenta		
						reproduce, how they		
				environments, and the distribution of major groups of organisms on earth.				
				orr ourun				
	PROGRAM a OUTCOMES: b			PROG OUTC		a □c □e □ b □d □f 🛚	g □i⊠k h⊠j	
	Degree R Requirements O Core Cou	Requirement O Free Elective O Tech Elective	O Other	Degree Require		egree Requirement (ore Course (Free Elective (Other
	Prereq			Prereq				
	O Enforced O Advised			O Enforce O Advised				
				Credit				
	Credit Restrictions			Restrictions				
	Level of Credit		ontact rs/Wk	M Hadasass	Level of Cre		Credit Hours Cont	
	Undergrad only Ugrad or N Rackham Grad All Credit ty Non-Rokhm Grad Rokhm Gra	mes Min May	Jumber	Undergrad	Grad Ali	Credit types khm Grad w/add'l Work	Min Max Numb	ner —
Ш,	□ Non-Rckhm Grad □ Rckhm Gra □ Ugrad or Rckhm Grad		f Wks		RCKNIM Grad		4 4 of Wk	s 14
C.		Dir. Study, Dissertation: Is this	course repeata	₩ IN	O Hours?	Times?	Can it be repeated in the same term?	O Yes
_	Class Type(s)	Grading Locat		Cogniz	ant Faculty I	Member:	Title	
Ш	X Lec		n Arbor ological Station	-			4	
	Graded Section	P/F Ca	amp Davis	<u> </u>				
		Other S/U Ex	tension	Grad C	ourco: Attach	nomination if Cognizar	at Faculty	
	Rec Lab Ind	Course Is Y Grad	led 🗆		ourse: Attach a regular gradi		it i acuity	
	Approval Info	Approved by Name	Approved Date	•	Submitte	ed By: Home Dep	t. X Cross-listed	Dept.
	Curriculum Comm.				Denarte	ment Chair Name	Chair Signa	turo
							Chair Signa	uie
	☐ Faculty ☐ Cross listed Unit 1			Home D		& Space		
	Cross listed Unit 1		 	Cross-I		,		
				_ De	ot(s). Biolog	f		

		2693	
SUPPORTING STATEMENT			
Updated CARF in support of new department name change and new c	urriculum		
экминатататата таки	0.000 (included in the control of th		
are any special resources or facilities required for this course?	Yes No		
Detail the Special requirements			
, the second			

	THE UNIV	VERSITY OF MICHIGAN COLLEC Course Approval Req		ENGINEERII	NG	Form Number	2694	
		urriculum Committee, 1420 Lurie En	gineerir	ng Center Bui	ilding	Date	10/20/2015	
	Action Requested	Complete the following sec	tions:			Dute	10/20/2010	_
	New Course Modification of Existing Course	New Courses B 9 C semple				Effective Term	Winter 2016	
	O Deletion of Course	Modifications - A modified info		on, B & C co			☑ Indefinitely	_
		Deletions - A & C completely	/			Course Offer Freq	One term on	ılv
	A. CURRENT LISTING			B. REQL	JESTED LIS	STING		
	Home Department	Course Nu	mber	Home Depa	rtment		Course	e Number
	AOSS Atmos, Oceanic & Sp	pace Sci 172		CLIMATE	Climate 8	Meteorology	172	2
Χ	Cross Listed Course Information			Cross Listed	d Course Info	rmation		
	Geol Science	172		EARTH E	arth and E	nvir Sci	172	2
	Sociology	111		Sociology			111	1
	SNRE	111		SNRE			111	1
	UC Till	111		UC TI			11′	1
П	Course Title			Course Title				
ш	Time Sched				n to Global	+ -		
	TITLE Max = 19 Spaces			TITLE ABBRE-	Time Sched Max = 19 Spaces	Global Change II		
	VIATION Transcript Max = 20 Spaces					Glob Chng II		
\Box	Course Description			Course Des	cription for O	fficial Publication (Max	c = 50 words)	
						evolution of life and		
						oblems of global ch		ру
				recent nun	ian auvano	es in technology an	a iristitutioris.	
			-					
		□e □g □i □k □f □h □j		PROGR OUTCOM			g □i ⊠k h ⊠j	
	Requirements O Core Course	irement O Free Elective O Othe	er	Degree Requirem		egree Requirement (ore Course (Free Elective (Tech Elective	Other .
	Prereq			Prereq				
	O Enforced O Advised			O Enforced O Advised				
				Credit				
	Credit Restrictions			Restrictions				
	Level of Credit Undergrad only Ugrad or Non-Ro	Credit Hours Hrs/Wk			evel of Cred	ad or Non-Rokhm Grad	redit Hours Conta	Vk 15
\Box				Undergrad or Rackham Gr	ad All (Grad Rok	Credit types thm Grad w/add'l Work	Min Max Numb	er
ш	□ Non-Rckhm Grad □ Rckhm Grad w/a □ Ugrad or Rckhm Grad	of Wks _		Non-Rckhm	nm Grad		4 4 of Wk	s 15
C.	Repeatability (Indi Research, Dir.	Study, Dissertation: Is this course	repeata	UNU UNU	Hours?	Times?	Can it be repeated in the same term?	O Yes
_	Class Type(s)	Grading Location		Cogniza	nt Faculty M	lember:	Title	
Χ	X Lec	her X A-E	Station	<u> </u>				
	Graded Section	P/F Camp Davi						
		S/II Extension		Grad Co.	ireo: Attach n	omination if Cognizar	t Faculty	
	Rec Lab Ind	Course Is Y Graded			egular gradu	ate faculty		
	Approval Info App	proved by Name Approve	ed Date	•	Submitte	d By: 🛮 Home Dep	t. Cross-listed	Dept.
	Curriculum Comm.				Denarto	nent Chair Name	Chair Signat	ure
				Home Dep			prian Signat	uic
	☐ Faculty ☐ Cross listed Unit 1				LIC	и орасе		
	Cross listed Unit 2			Cross-list	tea	nd Envir Sci		
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SUPPORTING	STATEMENT	

Updated CARF in support of new department name change and new curriculum.
Are any special resources or facilities required for this course?
Detail the Special requirements

	THE UNIVERSITY OF MICHIGAN COLLEGE OF Course Approval Request	ENGINEERING 2653
	College Curriculum Committee, 1420 Lurie Engineeri	ing Center Building Date 10/14/2015
	Action Requested New Course Complete the following sections	
	Modification of Existing Course New Courses - B & C completely	Effective Term Winter 2016
	O Deletion of Course Modifications - A modified informat Deletions - A & C completely	ion, B & C completely Course Offer Freq Indefinitely
	A. CURRENT LISTING	B. REQUESTED LISTING
	Home Department Course Number	Home Department Course Number
	AOSS Atmos, Oceanic & Space Sci 280	CLIMATE Climate & Meteorology 280
Х	Cross Listed Course Information	Cross Listed Course Information
		SPACE Space Science & Engineering 280
	Course Title	Course Title
	Course Title	
	TITLE Time Sched	Undergraduate Research Experience
	ABBRE- Max = 19 Spaces	ABBRE- Max = 19 Spaces Ogid Nes Experience
	VIATION Iranscript Max = 20 Spaces Course Description	VIATION Iranscript Ugrad Res Experience Course Description for Official Publication (Max = 50 words)
Χ	Individual or group research experience in atmospheric and space	Individual or group research experience in climate and space
	sciences. The program of work is arranged at the beginning of the	sciences. The program of work is arranged at the beginning of the
	semester by mutual agreement between the student and a faculty	semester by mutual agreement between the student and a faculty
	member. Written and/or oral reports will be required.	member. Written and/or oral reports will be required.
	PROGRAM Da Dc De Dg Di Dk	PROGRAM Xa Xc Xe ☐g Xi Xk
	OUTCOMES: b d f h j	OUTCOMES: Sb Sd f h j
	Degree O Degree Requirement O Free Elective O Other	Degree Requirements ○ Degree Requirement Requirements ○ Core Course ○ Tech Elective Prereq
	O Enforced	O Enforced
Щ	O Advised	O Advised
П	Credit Restrictions	Credit Restrictions
	Level of Credit IN Undergrad only □ Ugrad or Non-Rickhm Grad Credit Hours Contact Hrs/Wk 4-12	Level of Credit X Undergrad only
	Max Undergrad only Ugrad or Non-Rekhm Grad All Credit year All Credit Hours Hrs/Wk 4-12 All Max Mumber All Min Max Number All Min All M	Radial Gradia All Credit type Radia Min Max Number Of Wks 13
C.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata	Hours? Times? In the same term? No
$\overline{}$	Class Type(s) Grading Location □ Lec □ Sem □ Dis □ Other □ ☒ A-F ☒ Ann Arbor	Cognizant Faculty Member: Title
ш	☐ Lec ☐ Sem ☐ Dis ☐ Other ☐ A-E ☒ Ann Arbor ☐ Rec ☒ Lab ☐ Ind ☐ CR/NC ☐ Biological Station	
	Graded Section P/F Camp Davis	
	☐ Lec ☐ Sem ☐ Dis ☐ Other ☐ S/O ☐ Extension ☐ Rec ☑ Lab ☐ Ind ☐ Course Is Y Graded ☐	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty
	Approval Info Approved by Name Approved Date	—
	Curriculum Comm.	Donartment Chair Name Chair Size-turn
		Department Chair Name Chair Signature Home Dept. Climate & Space
	☐ Faculty ☐ Cross listed Unit 1	
	☐ Cross listed Unit 2	Cross-listed Dept(s).

2653

SUPPORTING STATEMENT	
Updated CARF is support of new department name change and new curriculum	
Are any special resources or facilities required for this course?	No
	1110
Detail the Special requirements	

			OF MICHIGAN COL Course Approval I Committee, 1420 Lurie	Request	en earne	Form Number	2655		
Action	Requested				Dunding	Date	10/14/2015		
○ New	Course		plete the following						
	lification of Existing C		Courses - B & C con		1 1000	Effective Tern	n Winter 2016		
ODele	etion of Course		fications - A modified		C completely		a ☑ Indefinitely		
		Delet	tions - A & C comple	etely		Course Offer Fre	One term of	di e	
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Home	Department		Course	Number Home D	epartment		Cours	Numb	
AOSS	Atmos, Oceanic	& Space Sc	320	CLIMA	TE Climata	9 Motocrology	20		
_			320			& Meteorology	32		
Cross Li	isted Course Informat	ion		Cross L	isted Course In	formation			
Geolog	gical Sciences		GEOSCI 320	0 SPACE	E Space Sci	ence & Engineerii	ng 32)	
					HEarth and	Environmental So	ciences 32)	
Course	Title			Course	Title				
Earth S	ystems Evolution			Farth a	nd Snace Sue	tems Evolution			
	Time Sched		2010/10/2000		Time Sched	_			
TITLE ABBRE-	Max = 19 Spaces	Earth Sys E	volution	TITLE ABBRE-	Max = 19 Space	Earth & Sp Sys E	vol		
VIATION	Transcript Max = 20 Spaces	Earth Sys E	volution	VIATION	Transcript May = 20 Space	Earth & Sp Sys E	vol		
Course	Description	1		100,000		Official Publication (Ma			
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	s are discussed ale					ed along with chem			
	ogeochemical cycles. The connections among the carbon cycle,				biogeochemical cycles. The connections among the carbon cycle silicate weathering, and the natural greenhouse effect are				
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		Col		Course A	AN COLLEGE OF Approval Request 420 Lurie Engineer			Form Number	2637	
	Action Requirements New Cours Modification Deletion of	se on of Existing	Course New Mod	Courses - B	Rections & C completely modified informatic completely		completely	Date Effective Term Course Offer Freq		ely
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		THE	UNIVERSITY	OF MICHIGAN Course Appro		ENGINEE	RING	Form Number	2656	
			je Curriculum (Committee, 1420 I		ng Center E	Building	Date	10/14/201	
		equested	Comp	lete the follow	ing sections:			Date	10/14/201	
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	ABBRE VIATION	Transcript Max = 20 Spaces				ABBRE- · VIATION	Transcript Max = 20 Space	Family Comp American	is	
ш [.]	Course D					Course D		Official Publication (Ma	x = 50 words)	
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								lude linear systems,		
								statistical error anal tical concepts. Labs		
								ds to analysis of field		
								nment. Applications		
								ary boundary layer, o		
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	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree Require	ments O	Degree Requirement (Core Course (O Free Electiv O Tech Electi	ve O Other ve
_	Prereq O Enforce	ad				Prereq O Enforce	None			
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	Credit Restrictions					Credit Restrictions				
		Level of Credit			ontact rs/Wk	S7	Level of Cr	l,	Credit Hours	Contact———————————————————————————————————
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		pility (Indi Research,	Dir. Study, Dis		course repeata	\bigcirc \vee	es May	Max Times?	Can it be repe	eated O Yes
C.	Class T	vpe(s)	Gi	rading Locati	ion	Cogniz	ant Faculty		Title	
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	Appro	val Info	Approved by		Approved Date			ted By: A Home Dep	ot. Cross-l	isted Dept.
		rriculum Comm.					Dance	mont Chair Nar	hair o	ianatura
						٦	1	ment Chair Name and Space Science		ignature
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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	

		IVERSITY OF MICHIGAN COLLEGE Course Approval Requesturriculum Committee, 1420 Lurie Engine	st Form Number	
Action	Requested		Date 10/14/2015	
Mod	w Course dification of Existing Course		y Effective Term Winter 2016	= 1
	etion of Course	Modifications - A modified inform Deletions - A & C completely	Course Offer Freq Indefinitely	-
	URRENT LISTING		B. REQUESTED LISTING	ily
Home	Department	Course Number	Home Department Course	Numb
AOSS	Atmos, Oceanic & Sp	pace Sci 350	CLIMATE Climate & Meteorology 350)
Cross L	isted Course Information		Cross Listed Course Information	
GEOS	CI Geological Science	es 350	SPACE Space Science & Engineering 350)
			EARTH Earth and Envir Sci 350)
Course	Title		Course Title	
_			Atmospheric Thermodynamics	
TITLE	Time Sched		Time School	
ABBRE- VIATION	Max = 19 Spaces Transcript		ABBRE- Max = 19 Spaces Atm Thermo	
	Max = 20 Spaces Description		VIATION Transcript Atm Thermo	
Course	Description		Course Description for Official Publication (Max = 50 words) Fundamentals of thermodynamics are presented, including	
			phase changes, vapor pressure, humidity, and atmospheric stability. The Kinetic Theory of Gases provides a molecular perspective on the various forms of atmospheric water sub and on macroscopic phenomenology in general.	
	GRAM a c C	e g ∏i ∏k f ∏h ∏j	PROGRAM	
Degree Require		rement O Free Elective O Other O Tech Elective	Requirements O Core Course O Tech Elective	Other
Prereq O Enforce			Prereq Math 216 or equivalent, C or better	
O Advise			Enforced Advised	
Credit Restrictions			Credit Restrictions	
Undergra	Level of Credit ad only Ugrad or Non-Rokl in Grad All Credit types hm Grad Rokhim Grad Wade	Credit Hours Hrs/Wk 4 Min Max Work 4 4 Contact Hrs/Wk 4	Level of Credit X Undergrad only Used or Non-Richhm Grad Rachham Grad Rachham Grad Rachham Grad Rachham Grad Rachham Grad Rachham Grad Rachham Grad wladd1 Work 3 3 3 of Wes.	
Ugrad or	Rickhm Grad	4 4 of Wks 14		3
	HORITIM Grad	tudy, Dissertation: Is this course repeal	table? Yes Max Max Can it be repeated	14) Yes
Repeata Class 1	bility (Indi Research, Dir. S	tudy, Dissertation: Is this course repeat	table? Yes Max Max Can it be repeated	14
Repeata Class 1	bility (Indi Research, Dir. S	tudy, Dissertation: Is this course repeat	table?	14) Yes
Class 1	bility (Indi Research, Dir. S Type(s) Sem Dis Othe	tudy, Dissertation: Is this course repeal Grading Location F A-E X Ann Arbor Biological Station P/F Camp Davis	table?	14) Yes
Repeata Class 1 X Lec Rec Graded	Notified House Hou	tudy, Dissertation: Is this course repeal Grading Location F. A.E. Ann Arbor CRINC Biological Station P.F. Camp Davis St.I. Extensions	table? Yes Max Max Can it be repeated in the same term? Cognizant Faculty Member: Title Grad Course: Attach nomination if Cognizant Faculty	14) Yes
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		quired for this cour	se? □Yes ⊠No		
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2658

SUPPORTING STATEMENT	
Updated CARF in support of new department name change and new c	
Are any special resources or facilities required for this course?	☐ Yes ເNo
Detail the Special requirements	

	THE UNIVERSITY OF MICHIGAN COLLEG Course Approval Requ College Curriculum Committee, 1420 Lurie Engi Action Requested	est Form Number
	New Course Modification of Existing Course Deletion of Course Complete the following sections New Courses - B & C complete Modifications - A modified infor Deletions - A & C completely	ions: Effective Term Fall 2015
	A. CURRENT LISTING	B. REQUESTED LISTING One term only
	Home Department Course Number	The state of the s
	AOSS Atmos, Oceanic & Space Sci 380	CLIMATE Climate & Meteorology 380
Х	Cross Listed Course Information	Cross Listed Course Information
	GEOSCI Geological Sciences 381	SPACE Space Science & Engineering 380 EARTH Earth and Environmental Sciences 381
	Course Title	Course Title Introduction to Atmospheric Radiation
	TITLE Time Sched Max = 19 Spaces	TITLE Time Sched Max = 19 Spaces Intro Atm Radiation
	VIATION Transcript Max = 20 Spaces	VIATION Transcript Transcript Max = 20 Spaces Intro Atm Radiation
	Course Description	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: b d f h j Degree O Degree Requirement O Free Elective O Other	PROGRAM OUTCOMES: b d f x h x j
	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective	Degree O Degree Requirement O Free Elective O Other Requirements © Core Course O Tech Elective
- 1	Prereq	Prereq Math 216 or equivalent, C or better
	O Enforced O Advised	Enforced Advised
_	Credit Restrictions	Credit Restrictions
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	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repe	O Yes
	Class Type(s)	
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	Approval Info Approved by Name Approved D	
	Faculty	Home Dept. Climate & Space
	Cross listed Unit 1	Cross-listed Earth and Environ. Sci Dept(s).

				Form Number 2659	
UPPORTING STA					
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Course	Title				Course Title		earch Experience I	i	
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PORTING STATEMI ated CARE in support		t name change and	new curriculum		
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		ERSITY OF MICHIGAN COLLEGE O Course Approval Request riculum Committee, 1420 Lurie Enginee			Form Number	2661
Acti	on Requested	STATE OF SECURITY STATES OF SECURITY STATES	(1)	9	Date	10/14/2015
	lew Course	Complete the following section:	s:			Winter 2016
	Modification of Existing Course Deletion of Course	New Courses - B & C completely Modifications - A modified informa	tion B & C con	nnlataly	Effective Term	Willter 2016
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Α.	CURRENT LISTING	,	B. REQUE	STED LI		One term only
	ne Department	Course Number			STING	Course Number
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-	SS Atmos, Oceanic & Spa	ce Sci 401	CLIMATE C	Climate &	& Meteorology	401
X Cross	s Listed Course Information		Cross Listed C	Course Info	ormation	
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BUPPORTING 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.				Form Number 2661	
No.current student will be negatively impacted by the credit change of this course.					
e any special resources or facilities required for this course? □ Yes ⊗ No	 				
e any special resources or facilities required for this course? ☐ Yes ※No	 7. M. 1. M.	MANAM.NJ.HIM.NIDMILM	MUSE.MI.MIR.MANISEA	 	
e any special resources or facilities required for this course? ☐ Yes ※ No	 ••••••••			 	
e any special resources or facilities required for this course? ☐ Yes ※No	 			 ***************************************	
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e any special resources or facilities required for this course? ☐ Yes ※ No	 			 	
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				Course Appr	- COLLEGE OF oval Request				Form Number		2662	:	
	Action R	Colleg equested	je Curriculum C	Committee, 1420	Lurie Engineerii	ng Center E	uilding		Date	10)/14/201	15	
	O New C	•			ving sections:					10/	: O	046]
	Modifie	cation of Existing Co		Courses - B & C	C completely dified informati	on B o	complete	sh.	Effective Terr	m vv	inter 20	J16	
	U Deletio	on of Course		ons - A & C co		OII, D & C	complete		ourse Offer Fre	a 🗵	Indefir	nitely	
	A. CUF	RENT LISTING			1 7	B. REC	UESTE				One to	erm onl	у
		epartment		C	ourse Number	Home Dep						Course	Number
	AOSS A	tmos, Oceanic &	Snace Sci		405	CLIMAT	F Clima	te &	Meteorology			405	
		ed Course Information			400	Cross List						-100	
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						SPACE	Space 3	SCIEI	ice & Engineer	iiig		400	
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Ш						Special T	opics						
	TITLE	Time Sched Max = 19 Spaces				TITLE	Time Scl Max = 19 S	hed Spaces	Special Topics				
	ABBRE VIATION	Transcript Max = 20 Spaces				ABBRE VIATION	Transcrit	ot					
	Course D						Max = 20 S escription		ficial Publication (M	Лах = 5	50 words	3)	
Х	Advance	s in specific fields	of Atmosphe	ric, Oceanic ar	nd Space	Advance	s in spec	ific fie	elds of Climate a	nd Sp	ace Sc	iences	as
	Sciences	as revealed by re	ecent research	h.		revealed	by recer	t rese	earch.				
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	Prereq					Prereq O Enforce		sion of	fInstructor				
	O Enforce O Advised					O Advised							
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	Restrictions	I amal of Constit		I .		Restrictions	Level of	Crodi	i÷	_			
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		d only Ugrad or N Grad All Credit t m Grad Rckhm Gr Rckhm Grad	ypes ad w/add'l Work		Number	Rackham Non-Rckh	Grad m Grad tckhm Grad	X Alī C □ Rckh	redit types nm Grad w/add'l Work	Min 1	_	Numbe	
_	,				of Wks	(i) Y						of Wks	Yes
C.	Repeatal	oility (Indi Research,	Dir. Study, Dis	sertation: Is thi	s course repeata	ıble? ŎN			6 Max Times?		it be rep ne same		O No
C.	Class T	ype(s)	Gr	ading Loca	ition	Cogniz	ant Facu	Ity M	ember:		Title		
					nn Arbor	staff					Profess	sor	
	_	Lab Ind			Siological Station Camp Davis								
		Section Dis			xtension								
	Rec			Course Is Y Gra	ded 🗆		ourse: Atta regular g		omination if Cogniz ite faculty	ant Fa	aculty		
	Appro	val Info	Approved by		Approved Date				By: Home D	ept. [Cross	-listed [Dept.
	ı <u></u> .	rriculum Comm.					_		Ob-i- N	_	h	D:	
	_						1		ent Chair Name	е	Chair S	Signatu	ıre
	Fac					Home D	ept. Clin	iate 8	& Space		_		
	_	oss listed Unit 1				Cross-I					-		
						De _l	ot(s)				·		

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UPPORTING STATEMENT	
Ipdated CARF in support of new department name change and new curriculum	
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e any special resources or facilities required for this course?	0
etail the Special requirements	
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	THE UNIVERSITY OF MICHIGAN CO Course Approval	ENGINEER	ING		Form Number	266	3		
	College Curriculum Committee, 1420 Luri	ng Center B	uilding		Date	10/14/20	15	1	
	Action Requested Complete the following	sections:				Date	10/14/20	13	
	Modification of Existing Course New Courses - B & C co	mpletely				Effective Term	Winter 2	016	
	O Deletion of Course Modifications - A modifie Deletions - A & C completions - A & C c	on, B & C	completel		urse Offer Freq	✓ Indefi	nitely	•	
	A. CURRENT LISTING	etery	B. REC	UESTED			One t		у
		se Number	Home Dep		LIGIT	1110		Course	Number
	AOSS Atmos, Oceanic & Space Sci 41	10			ite & N	Neteorology		410	
Y	Cross Listed Course Information	<u> </u>	Cross List					-110	
	GEOSCI Geological Sciences		EARTH					409	
	O TH		0 7	41.					
	Course Title		Course Ti						
	Time Sched		Earth Sys	Time Sche					
	TITLE Max = 19 Spaces ABBRE- VIATION Transcript Transcript		ABBRE-	Max = 19 Sp		arth System Mo			
	VIATION I ranscript Max = 20 Spaces Course Description		VIATION Do	Max = 20 Sp	paces E	arth System Mo	deling	0/	
	Course Description					stem Modeling; E			nv.
						cycle models, a			
						e scales; Method			lution
			and pract	tice buildi	ing and	d analyzing resul	its from mo	dels.	
	PROGRAM Da Do De Do Di Dk		PROG	DAM		∇ - ∇ - ∇	1		
	OUTCOMES: b d f h j		OUTCO		⊠b	X c X e X ☐ d ☐ f X	(g∏i (h⊠j		
	Requirements O Core Course O Tech Elective	Other	Degree Require	ments @	Core		Company Tech Electrical	ctive	Other .
	Prereq AOSS 320, AOSS 321 O Enforced		Prereq O Enforced		E 320,	CLIMATE 321, SF	ACE 320, S	PACE 3	21
<u>X</u>	O Advised		Advised	1					
\neg	Credit Restrictions		Credit Restrictions						
	Level of Credit Conta			Level of C	Credit		D	Conta	
_	Undergrad only Ugrad or Non-Rekhm Grad Rackham Grad All Credit types Min Max Num Grad Ugrad or Rekhm Grad Rekhm Grad Wadd I Work		Undergrad	only Grad	Ugrad o	or Non-Rckhm Grad dit types Grad w/add'l Work	Oredit Hours Min Max	Hrs/W Numbe	_
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C.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this co	urse repeata	() Ye	es Max		Max Times?	Can it be re in the same		O Yes
<u> </u>	Class Type(s) Grading Location		Cogniz	ant Facul	Ity Mer	mber:	Title		
		Arbor gical Station					-		
	Graded Section P/F Camp	Davis							
	Lec Sem Dis Other S/U Exten		Grad Co	ourse: Atta	ach nom	nination if Cogniza	nt Faculty		
	Rec Lab Ind Course Is Y Graded		is not a	regular gr	raduate	faculty			>4
	- PP	proved Date	9	Subn	mitted E	By: 🛛 Home Dep	ot. ∐ Cros	s-listed E	лерт.
	Curriculum Comm.		_	Depa	artmer	nt Chair Name	Chair	Signati	ure
	☐ Faculty		Home De	ept. Clima	ate & S	Space			
	Cross listed Unit 1		Cross-li	sted Earth	th and I	Envir Sci			
	☐ Cross listed Unit 2		Dep	ot(s)					

Form	Number
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SUPPORTING STATEMENT	
Updated CARF in support of new department name change and new c	
Are any special resources or facilities required for this course?	Yes No
Detail the Special requirements	
Detail the Special requirements	

				OF MICHIGAN Course Appro	val Request			Form Nu	mber	2664	
	Action R	equested			-	-	ullullig		Date 1	0/14/2015	i
		course cation of Existing Co	urse New C	lete the follow courses - B & C cations - A mod	completely		completely	Effective	_	/inter 201	
	0			ons - A & C cor				Course Offe		Indefinit One ter	
		RENT LISTING		Co	urse Number		QUESTED	LISTING			Course Number
		epartment		00		Home Dep		0.14.		C	
_		tmos, Oceanic and Course Informati			411			& Meteorolo	gy		411
Х					444	ı	ed Course Ir				411
	GEUSU	l Geological Sci	ences		411	EARIH	Earth and	Elivii Sci			411
П	Course Ti	tle				Course T					
ш		Time Sched					d Precipitat	ion Processes			
	TITLE ABBRE-	Max = 19 Spaces				TITLE ABBRE	Max = 19 Space	ces Cloud & Pr	ecip Proce	es	
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	Course D	escription				l .		Official Publicat of water substa			
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	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree Require		Degree Require Core Course		ree Electiv ech Electiv	
_	Prereq O Enforce	AOSS 350, Math	216			Prereq O Enforce		350, SPACE 35	0, Math 210	6	
Х	O Advised					Advised					
	Credit Restrictions					Credit Restrictions					
	Undergrad	Level of Credit d only Ugrad or N Grad All Credit n m Grad Rokhm Grad	lon-Rckhm Grad ypes ad w/add'l Work	Credit Hours Hi	ontact rs/Wk lumber f Wks	Undergrad Rackham Non-Rckh	Level of Cr d only U Grad W m Grad E Rckhm Grad	edit Jgrad or Non-Rckhm All Credit types Rckhm Grad w/add'l N	Grad Crec Mir Work 3	dit Hours	Contact Hrs/Wk 3 Number of Wks 14
C.	Repeatal	oility (Indi Research,	Dir. Study, Dis	sertation: Is this	course repeata	ıble? ⊙ Y	es Max O Hours?	Max Times?		n it be repe he same te	
_	Class T			ading Locat		Cogniz	ant Faculty	Member:		Title	
Ш	Rec	Sem Dis Lab Ind			n Arbor ological Station						
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		val Info	Approved by		ed ⊔ Approved Date		a regular grad Submi	duate faculty tted By: X Ho	me Dept.	☐ Cross-li	isted Dept.
		rriculum Comm.						-		1	
						٦	1	tment Chair	wame	Chair Si	gnature
	☐ Fac	culty ass listed Unit 1				Home D	Earth	and Envir Sci		+	
		oss listed Unit 2				Cross-l	ot(s)				

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SUPPORTING STATEMENT		
Updated CARF in support of new department name change and new or	ırriculum.	
Are any special resources or facilities required for this course?	Yes X No	
Detail the Special requirements		
Detail the Opecial requirements		

		THE	UNIVERSITY	OF MICHIGAN Course Appro		ENGINEER	RING	Form Nu	mber	2665	
	Action D		ge Curriculum C	Committee, 1420 I	Lurie Engineerii	ng Center E	Building		Date 1	0/14/2015	i
	New C Modifie	equested Course cation of Existing Co on of Course	urse New C	lete the follow courses - B & C cations - A mod	completely		completely	Effective		Vinter 201	
	O Deletit	on or Course		ons - A & C cor		on, b a c	completely	Course Offe		Indefinit	
	A. CUF	RRENT LISTING				B. REC	QUESTED I	LISTING	L	One ter	m only
	Home De	epartment		Co	ourse Number	Home Dep	partment			С	ourse Number
	AOSS A	tmos, Oceanic a	& Space Sci		414	CLIMAT	E Climate	& Meteorolo	ogy		414
Χ	Cross List	ed Course Informati	on			Cross List	ed Course Ir	formation			
	GEOSC	I Geological Sci	ences		414	EARTH	Earth and	Envir Sci			414
$\overline{}$	Course Ti	itle				Course T	itle				
						Weather	Systems	1			
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	VIATION	Transcript Max = 20 Spaces				ABBRE- 1	Transcript Max = 20 Space	\A/4C	Sys.		
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	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree Require		Degree Require Core Course		ree Electiv rech Electiv	
	Prereq	AOSS 350, AOS	S 401 or AOSS	551		Prereq		350, SPACE 3	50, CLIMAT	E 401 or C	LIMATE 551
Х	O Enforce O Advised					EnforceAdvised					
\Box	Credit Restrictions					Credit Restrictions					
	Undergrad	Level of Credit d only Ugrad or N Grad All Credit 1 m Grad Rokhm Grad Rokhm Grad	Non-Rokhm Grad types ad w/add'i Work	Credit Hours Hi	ontact rs/Wk	Undergrad Rackham Non-Rckh	Level of Cr d only U Grad W m Grad E Rckhm Grad	edit Jgrad or Non-Rckhn All Credit types Rckhm Grad w/add'l	n Grad Cred Work 3	n Max	Contact Hrs/Wk 3 Number of Wks 14
C.	Repeatal	pility (Indi Research,	Dir. Study, Dis	sertation: Is this	course repeata	ıble? ⊙ Y	es Max O Hours?	Max Times?		n it be repe the same te	
_	Class T			rading Locat			ant Faculty	Member:		Title	
Ш		Sem Dis Lab Ind			in Arbor ological Station	Frank M	arsık			Assoc R	es Scientist
	Graded	Section		P/F Ca	amp Davis						
	Lec Lec	Sem Dis	_ Other =	_	tension	Grad C	ourse: Attach	n nomination if	Cognizant F	aculty	
	Rec			Course Is Y Grad		is not a	a regular grad	duate faculty tted By: X H			isted Dept
		val Info rriculum Comm.	Approved by	Name	Approved Date	e	Submi	пеаву: 🖾 П	отте пери.	C1098-II	окси рерк
		modum Comili.				_	Depar	tment Chair	Name	Chair Si	gnature
	☐ Fac					Home D	ept. Climat	e & Space			
		oss listed Unit 1				Cross-l	isted Earth	and Envir Sci			
	☐ Cro	oss listed Unit 2				De	ot(s)				

UPPORTING STATEMENT	
Jpdated CARF in support of new department name change and new curriculum	
e any special resources or facilities required for this course? ☐ Yes ☒ No	
Petail the Special requirements	

	THE UNIVI	ERSITY OF MICHIGAN COLLEG Course Approval Requ		RING	Form Number	2666	
	College Cur Action Requested	riculum Committee, 1420 Lurie Eng	ineering Center	Building	Date	10/14/2015	
	New Course Modification of Existing Course Deletion of Course	Complete the following sect New Courses - B & C complet Modifications - A modified info Deletions - A & C completely	ely	completely	Effective Term	Winter 201	
	A. CURRENT LISTING	Deletions - A & C completely	B. RE	QUESTED	•	One terr	
	Home Department	Course Num		partment	Liotino	C	ourse Number
	AOSS Atmos, Oceanic & Spa	ace Sci 422			& Meteorology		422
Х	Cross Listed Course Information			ted Course In			
	GEOSCI Geological Sciences	s	EARTH	Earth and	l Envir Sci		423
	Course Title		Course	Γitle			
Ш			Bounda	y Layer Me			
	TITLE Time Sched Max = 19 Spaces ABBRE-		TITLE ABBRE-	Time Sched Max = 19 Spa		let	
	VIATION Transcript Max = 20 Spaces		VIATION	Transcript Max = 20 Space	Boundary Layer M	let	
	Course Description		Explore plays ar momen applicat turbuler	escription for s processes i important r um betweer ions of gove ce, turbulen	Official Publication (Ma: in the atmospheric be- role in the exchange on a land and atmospher- terming atmospheric equality in the string atmospheric equality in the string at kinetic energy, the sand analysis of field flu	x = 50 words) coundary layer f energy, ma e. Topics incu uations, atmo urface energ	iss and clude ospheric gy balance,
		e g i k f h j rement O Free Elective O Other O Tech Elective	OUTC r Degree	OMES:	Degree Requirement (h j Free Elective Tech Elective	e O Other
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Ш.	O Advised		Advise	0			
	Credit Restrictions		Credit Restrictions	1	. 19		
	Level of Credit Undergrad only Rackham Grad Non-Rckhm Grad Ugrad or Rokhm Grad Ugrad or Rokhm Grad	hm Grad d'I Work Min Max Contact Hrs/Wk Number of Wks	Undergr Rackhar Non-Rck	Level of Cr	Ugrad or Non-Rickhm Grad	Min Max	Contact Hrs/Wk 4 lumber If Wks 14
C.	Repeatability (Indi Research, Dir. S	Study, Dissertation: Is this course re	epeatable?			Can it be repeated in the same te	
	Class Type(s)	CR/NC Biological St	tation Grad	a regular gra	h nomination if Cognizar duate faculty		
	/ ipprovar into	roved by Name Approve	d Date	Submi	itted By: A Home Dep	t. ∐ Cross-lis	sted Dept.
	Curriculum Comm.			Depar	tment Chair Name	Chair Si	gnature
	☐ Faculty		Home I	Dept. Climat	te & Space		
	Cross listed Unit 1		Cross	listed Earth	and Envir Sci		-
	Cross listed Unit 2		D	ept(s)			

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JPPORTING STATEMENT		•
pdated CARF in support of new department name change and new co	ırriculum	
e any special resources or facilities required for this course?	☐ Yes ※ No	
	☐ Yes ※ No	
	☐ Yes ※ No	
	☐ Yes ※ No	
, .,	☐ Yes ☒ No	
e any special resources or facilities required for this course? etail the Special requirements	□ Yes ※ No	

	THE UNIVERSITY OF MICHIGAN COLLEGE C Course Approval Request	
	College Curriculum Committee, 1420 Lurie Enginee	erina Center Buildina
	Action Requested Complete the following section	Date 10/14/2015
	○ New Course	Effective Term Winter 2016
	Deletion of Course Modifications - A modified information	ation, B & C completely
	Deletions - A & C completely	Course Offer Freq Indefinitely
	A. CURRENT LISTING	B. REQUESTED LISTING
	Home Department Course Number	Home Department Course Number
	AOSS Atmos, Oceanic & Space Sci 440	CLIMATE Climate & Meteorology 440
Х	Cross Listed Course Information	Cross Listed Course Information
	GEOSCI Geological Sciences	EARTH Earth and Envir Sci 454
	O T1	0 77
	Course Title	Course Title
	Time Sched	Meteorological Analysis Laboratory
	TITLE Max = 19 Spaces	ABBRE- Max = 19 Spaces Meteor Analysis Lab
	VIATION Transcript Max = 20 Spaces	VIATION Transcript Meteor Analysis Lab
\Box	Course Description	Course Description for Official Publication (Max = 50 words)
_		This course provides an introduction into the analysis of both surface-based and remotely-sensed meteorological data. The
		development and application of operational numerical forecast
		models will be discussed. Techniques for the prediction of both
		synoptic and mesoscale meteorological phenomena will also be
		presented.
	PROGRAM a cegik	PROGRAM
	OUTCOMES: b d f h j	OUTCOMES: b \ d \ f \ h \ j
	Degree O Degree Requirement O Free Elective O Other	Degree O Degree Requirement O Free Elective O Other
	Requirements O Core Course O Tech Elective Prereq AOSS 350, AOSS 401	Requirements ○ Core Course ● Tech Elective Prereq CLIMATE 350, SPACE 350, CLIMATE 401
	Prereq AOSS 350, AOSS 401 O Enforced	Prereq CLIMATE 350, SPACE 350, CLIMATE 401 O Enforced
<u> </u>	O Advised	Advised
\neg	Credit Restrictions	Credit Restrictions
	Level of Credit Contact	Level of Credit Contact
	Undergrad only Ugrad or Non-Rokhm Grad Rackham Grad Ni Credit House Hrs./Wk Min Max Uurnber Of Wks Ugrad or Rokhm Grad Ugrad or Rokhm Grad Wadd1 Work Ugrad or Rokhm Grad Of Wks	Ugrad or Non-Rickhm Grad Rackham Grad Rokhm Grad Waldri Work Ugrad or Non-Rickhm Grad Rackham Grad Rokhm Grad Waldri Work Ugrad or Non-Rickhm Grad
	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repea	O Yes
C.	Class Type(s) Grading Location	Cognizant Faculty Member: Title
	□ Lec □ Sem □ Dis □ Other □ ☒ A-E ☒ Ann Arbor	Frank J. Marsik Asst. Res. Sci.
	☐ Rec ☐ Lab ☐ Ind ☐ CR/NC ☐ Biological Static	on
	S/II Extension	
		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty
	Approval Info Approved by Name Approved D	— — — —
	Curriculum Comm.	Department Chair Name Chair Simution
		Department Chair Name Chair Signature
	☐ Faculty ☐ Cross listed Unit 1	Home Dept. Climate & Space
	Cross listed Unit 1	Cross-listed Earth and Envir Sci
		Dept(s)

2667

UPPORTING STATEMENT	
Jpdated CARF in support of new department name change and new curriculum	
e any special resources or facilities required for this course? ☐ Yes ☒ No	
Petail the Special requirements	

	THE UNIVERSITY OF MICHIGAN COLLEGE OF	ENGINEERING 2668
	Course Approval Request	Form Number
	College Curriculum Committee, 1420 Lurie Engineeri Action Requested	Date 10/14/2015
	New Course Complete the following sections:	
	Modification of Existing Course New Courses - B & C completely	Effective Term Winter 2016
	O Deletion of Course Modifications - A modified informati	
	Deletions - A & C completely	One term only
	A. CURRENT LISTING	B. REQUESTED LISTING
	Home Department Course Number	Home Department Course Number
	AOSS Atmos, Oceanic & Space Sci 441	CLIMATE Climate & Meteorology 441
Χ	Cross Listed Course Information	Cross Listed Course Information
	Course Title	Course Title Meteorology and Climate of the Rockies
	TITLE Time Sched	TITLE Time Sched Mat & Clim Realries
	Max = 19 Spaces	ABBRE- Max = 19 Spaces Mot & Clim 1 Control
	Max = 20 Spaces	Max = 20 Spaces Met & Clim Rockies
	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 Da Dc De Dg Di Dk	PROGRAM XIA C. C. P. XII C. K.
	OUTCOMES: b d f h j	PROGRAM
	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective	Degree ○ Degree Requirement ○ Free Elective ○ Other Requirements Requirements ○ Core Course ● Tech Elective
	Prereq AOSS 320, AOSS 321, AOSS 323 O Enforced	Prereq CLIMATE/SPACE 320, CLIMATE/SPACE 321, O Enforced CLIMATE/SPACE 323
Х	O Advised	Advised
	Credit Restrictions	Credit Restrictions
	Level of Credit Contact Credit Hours Hrs/Wk	Level of Credit Contact Credit Hours Hrs/Wk 48
	Undergrad only Ungrad or Non-Rekhm Grad Rackham Grad All Credit types Min Max Number of Wks	Ugrad or Non-Rekhm Grad All Credit types Ugrad or Non-Rekhm Grad Nachham Grad Nac
_	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata	able? No Hours? Max Max Can it be repeated Yes in the same term? No
C.	Class Type(s) Grading Location	Cognizant Faculty Member: Title
	Lec Sem Dis Other A-E Ann Arbor	
	Rec Lab Ind CR/NC Biological Station	
	Graded Section P/F Camp Davis	
	☐ Lec ☐ Sem ☐ Dis ☒ Other ☐ ☐ Course Is Y Graded ☐	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty
	Approval Info Approved by Name Approved Date	
	Curriculum Comm.	Department Chair Name Chair Signature
		Home Dept. Climate & Space
	☐ Faculty ☐ Cross listed Unit 1	
	Cross listed Unit 2	Cross-listed Dept(s).

-orm	Number	•

	2668	
SUPPORTING STATEMENT		
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		
The field class will be offered at Camp. Davis in WyomingThe availability of atmospheric measureme atmospheric boundary layer and the unique setting provided at the Geological Sciences Field Camp. a requirements. Vans for travel to any field camp will be required to transport the students and GS	re the two main	special

the instrumentation that will be brought to field camp.

Action Requ	College Curric	SITY OF MICHIGAN - C Course Approva Julum Committee, 1420 Lu Complete the followin	al Request rie Engineeri	Form Number 10/14/2015	
Modification Deletion of	on of Existing Course of Course	New Courses - B & C co Modifications - A modifications - A & C comp	ed informati	Effective Term Lion, B & C completely Course Offer Freq B. REQUESTED LISTING Winter 2016 Indefinitely One term only	
Home Depar		Cour	se Number	Home Department Course	Numb
				The state of the s	
	os, Oceanic & Spac Course Information	e Sci 4	42	CLIMATE Climate & Meteorology 442	
	invironmental Science	ces & Engin		Cross Listed Course Information ENSCEN Environmental Sciences & Engin 442	
Course Title				Course Title	
				Ocean Dynamics I	
ABBBE. MI	me Sched ax × 19 Spaces			TITLE Time Sched Max = 19 Spaces Ocean Dynamics I	
AGATION TO	anscript ux = 20 Spaces			VIATION Transcript Max = 20 Spaces Ocean Dynamics I	
Course Descr	iption	0.011		Course Description for Official Publication (Max = 50 words)	
				tides. Steady state circulation, including theories of boundar currents and the thermocline.	r.
PROGRAM				PROGRAM a c e g i k OUTCOMES: b d f b i	
		ent O Free Flective O	Other		Other
Degree		ent O Free Elective O O Tech Elective	Other		Other
Degree Requirement Prereq A	O Degree Requirem			Degree O Degree Requirement O Free Elective O	Other
Degree Requirement Prereq A O Enforced O Advised	O Degree Requirem			Degree O Degree Requirement O Free Elective O Requirements O Core Course O Tech Elective Prereq CLIMATE 401; C or better Enforced Advised	Other
Degree Requirement Prereq At O Enforced O Advised Credit Restrictions	O Degree Requirem ts O Core Course OSS 401	O Tech Elective		Degree O Degree Requirement O Free Elective O Requirements O Core Course O Tech Elective Prereq CLIMATE 401; C or better © Enforced O Advised Credit Restrictions	Other
Degree Requirement Prereq A O Enforced O Advised Credit Restrictions Leve	O Degree Requirem ts O Core Course OSS 401	O Tech Elective	ict	Degree O Degree Requirement O Free Elective O Requirements O Core Course O Tech Elective Prereq CLIMATE 401; C or better Enforced Advised	Other
Degree Requirement Prereq A/ C Enforced Advised Credt Restrictions Leve Undergrad only Rackham Grad Non-Rotkim Grad Ugrad or Rothm	Degree Requirem Core Course OSS 401 el of Credit Ugged or Non-Rahm Cod Coredit Non-Rahm God Grad Grad Grad	O Tech Elective Credit Hours Hrs/W Min Max Num	ict /k ber ks	Degree O Degree Requirement O Free Elective O Tech Elective O) Yes
Degree Requirement Prereq Av O Enforced O Advised Credit Restrictions Leve Undergrad only Radsher only Radsher or or Non-Rekten Gra Ugrad or Rekten Class Type(Cl	Degree Requirem O Core Course OSS 401 el of Credit Ugrad or Non-Roblan C All Credit types Robins Grad wladd? W (Indi Research, Dir. Stud. s) em Dis Other Indi Indi Ition	O Tech Elective Credit Hours Hrs/W Num of W y, Dissertation: Is this cou	rbor rical Station Davis	Degree Requirement O Free Elective O Tech Elec) Yes
Degree Requirement Prereq Ar Cenforced Advised Credit Restrictions Lev Undergrand only Radcham (Radcham Gra Non-Rickten Gra Uggard or Regular Class Type(Lec S Rec L	Degree Requirements O Core Course OSS 401 el of Credit	O Tech Elective Credit Hours HrszW Min Max Num of W y, Dissertation: Is this cou Grading Location A-E Ann A GRNC Biolog P/F Camp	ber ber size repeatable ribor rical Station Davis	Degree O Degree Requirement O Free Elective O Tech Elective O) Yes
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PPORTING STATE					
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iny special resource	es or facilities requi	ired for this course?	Yes No		
	es or facilities requi		☐ Yes ☐ No		
iny special resource	es or facilities requi		☐ Yes ☐ No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
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iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		
iny special resource	es or facilities requi		Yes No		

0	THE UNIVERSITY OF MICHIGAN COLLEGE OF Course Approval Request					3	Form Number	2670	
0		lege Curriculum	Committee, 1420		ng Center Build	ling		40/44/004/	
	ion Requested	Comi	plete the follow	vina sections:			Date	10/14/2015	•
	New Course Modification of Existing	Marri	Courses - B & C	-			Effective Term	Winter 20	16
0.0	Deletion of Course	Modif	ications - A mo		on, B & C cor				toly
		Delet	ions - A & C co	ompletely			Course Offer Freq	One ter	•
_	CURRENT LISTING	•			B. REQUE		STING		
	me Department			Course Number	Home Departi			C	Course Number
	SS Atmos, Oceani		i	451	CLIMATE	Climate &	Meteorology		451
X Cros	s Listed Course Inform	ation			Cross Listed	Course Info	rmation		
	SCEN Environmen		& Engin	451			ental Sciences &	Engin	451
GE	OSCI Geological S	ciences		457	EARTH Ea	rth and E	nvir Sci		457
Cou	rse Title				Course Title				
Ш					Atmospheric	: Dynamics	s I		
TIT	Time Sched				TITLE	Time Sched	Atmos Dynamics	1	
ABB VIAT	RE- Transcript				ABBRE- ME	x = 19 Spaces Transcript		!	
	Max = 20 Spaces rse Description				VIATION Ma	x = 20 Spaces	Atmos Dyn I ficial Publication (Ma	v = 50 words)	
	ise Description						ergetics; fronts; the		ation:
							ial waves; overviev		
							ave-mean flow inte	eraction; spe	ctral
					methods; ar	nd tropical	meteorology.		
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Det Receive Prender No. 10 E No. 10 E No. 10	gree Degree Degr	e Requirement Course MATH 450 or Non-Richtm Grad dift types Grad w/add I Work Critical Country Critical Cou	O Free Elective O Tech Elective Credit Hours Min Max Sesertation: Is this Grading Loca A E M A E	O Other	Degree Requirement Prereq C O Enforced Advised Credit Restrictions Le Restrictions Le Ugrad or Rekth	Dents O Code Code Code Code Code Code Code Code Code	gree Requirement re Course 1 or Math 450 it ad or Non-Rokhm Grad redit types mm Grad wladd1 Work Max Times?	Free Electi Tech Electi Tech Electi Credit Hours Min Max 4 4 4 Can it be repe in the same to	Contact Hrs/Wk 4 Number 14 Deated Yes
OL	gree Degree Degr	e Requirement Course MATH 450 or Non-Richtm Grad dift types Grad w/add1 Work Crad w/add1 Work Other Other Other	Credit Hours Min Max Sesertation: Is this Grading Loca (A.E. A.A. (CR/NC B.B.) (CR/NC B.B.)	O Other	Degree Requirement Prereq C S Enforced Advised Credit Restrictions Le Undergrad only Restrictions Undergrad only Restrictions Yes No. Cognizant	vel of Cred Vel o	gree Requirement re Course 1 or Math 450 it ad or Non-Rokhm Grad Tredit types hm Grad w/add1 Work Max Times?	↑ N S J ○ Free Electit ○ Tech Electit Credit Hours Min Max 4 4 4 4 4 T Can it be repe in the same to	Contact Hrs/Wk 4 Number 14 Deated Yes
Det Red Prer X O E C C. C. C. Grant X	gree Degree Degr	e Requirement Course MATH 450 or Non-Richtm Grad dift types Grad w/add1 Work Crad w/add1 Work Other Other Other	Credit Hours Min Max Sesertation: Is this Grading Loca (A.E. A.A. (CR/NC B.B.) (CR/NC B.B.)	O Other Contact Hrs/Wk Number of Wks s course repeata ttion nn Arbor iological Station zamp Davis extension	Degree Requirement Prereq C S Enforced Advised Credit Restrictions Le Undergrad only Roar-Roar-Roar-Roar-Roar-Roar-Roar-Roar-	vel of Cred Vel o	gree Requirement re Course 1 or Math 450 it add or Non-Rokhm Grad County Speak Wadd1 Work Manual Times? lember:	↑ N S J ○ Free Electit ○ Tech Electit Credit Hours Min Max 4 4 4 4 4 T Can it be repe in the same to	Contact Hrs/Wk 4 Number 14 Deated Yes
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Der Reter Note Der Reter Preter O E O A O E Restrict Restrict Gradfin Ref Gradfin A A A A A A A	gree Degree Degree University of the Control of the	d f f e Requirement Course MATH 450 or Non-Rokhm Grad did types Grad windad1 Work Other Other Approved b	Credit Hours Min Max Sesertation: Is this crading Loca A PF S VU S S VU S Course Is Y Grant	O Other Contact Hrs/Wk Number of Wks s course repeata tition un Arbor iological Station zamp Davis ixtension ded ded	Degree Requirement Prereq C S Enforced Advised Creditions Le Undergrad only Restrictions Le Non-Richard Grad Non-Richard Grad Non-Richard Grad Cours is not a restriction of the Richard Cours in the Richard Cours is not a restriction of the Richard Cours in the Richard Cours is not a restriction of the Richard Cours in the	vel of Cred Vel o	gree Requirement re Course 1 or Math 450 it it ad or Non-Rickhm Grad Fredit types fred types fred WeddT Work Max Times? Jember: comination if Cogniza ate faculty d By: Memor De	Credit Hours Min Max 4 4 4 Title Title The same to th	Contact Hrs/Wk 4 Number 14 eated Yes
Deg Rev Rev Credit Restrict Re	gree Degree O Degree Universely O Core is equiversely O Core is eq	d f f e Requirement Course MATH 450 or Non-Rokhm Grad did types Grad windad1 Work Other Other Approved b	Credit Hours Min Max Sesertation: Is this crading Loca A PF S VU S S VU S Course Is Y Grant	O Other Contact Hrs/Wk Number of Wks s course repeata tition un Arbor iological Station zamp Davis ixtension ded ded	Degree Requiremeit Prereq C S Enforced Advised Credit Restrictions Le S S S S S S S S S S S S S S S S S S	vel of Cred Vel o	gree Requirement re Course 1 or Math 450 it it ad or Non-Rickhm Grad Fredit types fred types fred WeddT Work Max Times? Jember: comination if Cogniza ate faculty d By: Memor De	Credit Hours Min Max 4 4 4 Title Title Title Chair S	Contact Hrs/Wk 4 Number Of Wks 14 Deated Yes Derm? No

2670

SUPPORTING STATEMENT		ı
Updated CARF in support of new department name change and new co	ırriculum.	
are any special resources or facilities required for this course?	☐ Yes 🔀 No	
Detail the Special requirements		

	THE UNIVERSITY OF MICHIGAN COLLEGE OF	ENGINEERING 2674
	Course Approval Request	Form Number
	College Curriculum Committee, 1420 Lurie Engineeri	ing Center Building Date 10/14/2015
	Action Requested Complete the following sections	
	New Course Modification of Existing Course New Courses - B & C completely	Effective Term Winter 2016
	Deletion of Course Modifications - A modified informat	ion, B & C completely
	Deletions - A & C completely	Course Offer Freq Indefinitely
	A. CURRENT LISTING	B. REQUESTED LISTING One term only
	Home Department Course Number	Home Department Course Number
	'	· '
_		
	Cross Listed Course Information	Cross Listed Course Information
		SPACE Space Science & Engineering 462
	Course Title	Course Title
Ш		Instrumentation for Atmospheric and Space Sciences
	TITLE Time Sched Max = 19 Spaces	TITLE Time Sched May - 19 Spaces Instruments ATM SPA
	ABBRE- VIATION Transcript	ABBRE- Max = 10 opaces
	Max = 20 Spaces	Max = 20 Spaces 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.
		The state of the s
	PROGRAM a ceggik	PROGRAM ⊠a □c ⊠e ⊠g □i ⊠k
	OUTCOMES: b d f h j	OUTCOMES: b d f h j
	Degree O Degree Requirement O Free Elective O Other	Degree O Degree Requirement O Free Elective O Other
	Requirements O Core Course O Tech Elective	Requirements O Core Course O Tech Elective
	Prereq AOSS 350	Prereq CLIMATE 350, SPACE 350
Х	● Enforced	© Enforced
_	O Advised	Advised
	Credit Restrictions	Credit Restrictions
ш	Level of Credit Contact	Level of Credit Contact.
	□ Undergrad only □ Ugrad or Non-Rekhm Grad Rackham Grad □ Alc Credit types □ Non-Rekhm Grad □ Rekhm Grad wladd1 Work □ Min Max □ Non-Rekhm Grad □ Rekhm Grad wladd1 Work □ □ Min Max □ Of Wks □ Non-Rekhm Grad □ Rekhm Grad wladd1 Work □ □ Of Wks □ Non-Rekhm Grad □ Rekhm Grad □ Re	Undergrad only
		O Ves
_	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable)	able? No No Hours? Max Times? Can it be repeated Yes in the same term? No
C.	Class Type(s) Grading Location	Cognizant Faculty Member: Title
		Title
ш	Rec Lab Ind CR/NC Biological Station	
	Graded Section P/F Camp Davis	
		Grad Course: Attach nomination if Cognizant Faculty
	Rec Lab Ind Course Is Y Graded	is not a regular graduate faculty
	Approval Info Approved by Name Approved Date	te Submitted By: Home Dept. Cross-listed Dept.
	Curriculum Comm.	Department Chair Name - busin Circuit
		Department Chair Name Chair Signature
	Faculty	Home Dept. Climate & Space
	Cross listed Unit 1	Cross-listed
	Cross listed Unit 2	Dept(s)

2671

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UPPORTING STATEMENT			
Ipdated CARF in support of new department name and new curriculu	m.		
ратовтания по подражения по	176		
e any special resources or facilities required for this course?	□ Ves ▼ No		
	- res Zine		
etail the Special requirements			
		•••••	

	THE UNIVER	RSITY OF MICHIGAN (Course Appro		ENGINEER	RING	Form Number	2672	
		culum Committee, 1420 L	urie Engineerin	ng Center B	uilding	Date	10/14/2015	
	Action Requested New Course	Complete the followi	ng sections:			Dute	10/1 1/2010	_
	 Modification of Existing Course 	New Courses - B & C				Effective Term	Winter 2016	
		Modifications - A modi		on, B & C	completely	0 0" -	☑ Indefinitely	_
		Deletions - A & C com	npietely			Course Offer Freq	One term of	nly
	A. CURRENT LISTING				QUESTED L	ISTING		
	Home Department		urse Number	Home Dep				se Number
	AOSS Atmos, Oceanic & Space	ce Sci	466			& Meteorology	46	6
	Cross Listed Course Information				ed Course In	formation		
П	Course Title			Course T	itle			
Ш	,			Carbon-C	Climate Inte	raction		
	TITLE Time Sched Max = 19 Spaces			TITLE ABBRE-	Time Sched Max = 19 Space	es		
	VIATION Transcript Max = 20 Spaces			VIATION	Transcript Max = 20 Space	es		
\Box	Course Description			Course De		Official Publication (Ma	x = 50 words)	
				in the Ea	rth system -	on the exchange of c atmosphere, ocean role of carbon dioxic	n, lithosphere an	d
	PROGRAM a c ODUTCOMES: b d Degree ODegree Requirer	f 🗆 h 🗆 j	O Other	PROG OUTCO Degree	OMES:		g	O Other
	Requirements O Core Course	O Tech Elective	O Guiloi	Require			Tech Elective	0 04.0.
	Prereq For undergrads: AOSS 3	320 and AOSS 321		Prereq	For underg	raduates: CLIMATE/S	CIENCE 320 and	
Х	O Enforced O Advised			EnforceAdvised		SCIENCE 321		
	Credit			Credit				
	Restrictions			Restrictions	1	. 124		
	Level of Credit Undergrad only Ugrad or Non-Rckhm Rackham Grad Ugrad or Non-Rckhm Non-Rckhm Grad Rckhm Grad wladd1	m Grad Credit Hours Hrs	ntact s/Wk umber Wks	Undergrad Rackham Non-Rckhi Ugrad or F	m Grad		Credit Hours Min Max Num of W	Wk 3 ber
C.	Repeatability (Indi Research, Dir. Stu	udy, Dissertation: Is this	course repeata	ble? O Y		Max Times?	Can it be repeated in the same term?	
_	Class Type(s)	Grading Location		1	ant Faculty		Title	
	X Lec Sem Dis Other Rec Lab Ind		n Arbor logical Station	Gretchei	n Keppel-Al	eks	Assistant Pr	otessor
	Graded Section	☐ P/F ☐ Car	mp Davis	-				
	Lec	r S/U Ext	ension	Grad C	ourse: Attach	nomination if Cogniza	nt Faculty	
	Rec Lab Ind	Course Is Y Grade	ed 🗆		regular grad	luate faculty		
	11pp 11 11 11 11 11 11 11 11 11 11 11 11	oved by Name	Approved Date	•	Submit	ted By: 🛮 Home Dep	ot. Cross-listed	I Dept.
	Curriculum Comm.				Depar	tment Chair Name	Chair Signa	iture
	☐ Faculty			Home D		e & Space		
	Cross listed Unit 1			Cross-I		•		
	Cross listed Unit 2				ot(s)			

JPPORTING STATEMENT	
Ipdated CARF in support of new department name and new curriculum	l
e any special resources or facilities required for this course?	
etail the Special requirements	

	THE UNIVE	ERSITY OF MICHIGAN (ENGINEE	RING	Form Name -	2673				
	College Curr	Course Appror riculum Committee, 1420 L	na Center F	Building	Form Number					
	Action Requested			•	-anding	Date	10/14/201	5		
	O New Course	Complete the followi	-				Winter 20	16		
	Modification of Existing Course	New Courses - B & C Modifications - A modi		on B&C	completely	Effective Term	Willter 20	10		
	O Deletion of Course	Deletions - A & C com		on, b a c		Course Offer Freq	☑ Indefini	itely		
	A. CURRENT LISTING	20.00.010 71 0 0 001	.p.o.o.y	B. RE	QUESTED LI		One te	rm only		
	Home Department	Con	urse Number			ISTING		Course Number		
	· ·			Home De			(
	AOSS Atmos, Oceanic & Spa	ace Sci	467	AOSS A	Atmos, Ocea	anic & Space Sci		467		
Χ	Cross Listed Course Information			Cross Lis	ted Course Inf	ormation				
	CHEM Chemistry		467	CHEM				467		
	GEOSCI Geological Sciences	S	465	EARTH	Earth and E	Envir Sci		465		
	ENSCEN		467	ENSCE	N Environm	nental Sciences & I	Engin	467		
	ENVIRON Environment			ENVIR				467		
П	Course Title			Course 7	itle					
ш				Biogeocl	nemical Cycle	es				
	TITLE Time Sched Max = 19 Spaces			TITLE ABBRE-	Time Sched Max = 19 Space	s Biogeochem. Cycl	es			
	VIATION Transcript Max = 20 Spaces			VIATION	Transcript May - 20 Second	Biogeochem				
	Course Description			Course D		Official Publication (Max	= 50 words))		
Ш				The biog	eochemical	cycles of water, carb	on, nitroger	n, and sulfur;		
				the atmo	sphere and	oceans as reservoirs	and reaction	on media; the		
						an-made sources of		ogen, and		
						e interactions among				
						es and resultant glob- ozone depletion.	ai change; (greennouse		
				gases, a	olu falli aliu i	ozone depletion.				
	PROGRAM a c	_e _g _i _k		PROC	RAM X	[а □с □е 🛛	a 🛛 i 🗆	k		
		df dh di dh		OUTC		b 🛛 d 🖂 f 🖂	n ⊠j			
	Degree O Degree Requirement O Free Elective O Other				Degree O Degree Requirement O Free Elective O Other					
	Requirements O Core Course	O Tech Elective		Require	ments OC	ore Course	Tech Electi			
	Prereq			Prereq		Chem 210, Phys 240				
	O Enforced O Advised			EnforceAdvised						
				Credit						
	Credit Restrictions			Restrictions						
	Level of Credit		ntact		Level of Cre		redit Hours	Contact		
$\overline{}$	☐ Undergrad only ☐ Ugrad or Non-Rckf☐ Rackham Grad ☐ All Credit types ☐ Rckhm Grad w/add		s/Wk	Undergra Rackham Non-Rckh	d only ☐ Ug Grad		Min Max	Hrs/Wk 3		
Ш	☐ Non-Rckhm Grad ☐ Rckhm Grad w/add ☐ Ugrad or Rckhm Grad	of	Wks	☐ Non-Rckh	Rckhm Grad	xnm Grad W/add1 vvork	3 3	Number of Wks 14		
C.	Repeatability (Indi Research, Dir. S	tudy, Dissertation: Is this	course repeata	O 1.	lo Hours?	Times?	Can it be reponent the same to			
	Class Type(s)	Grading Location	on	Cogni	zant Faculty I	Member:	Title			
	X Lec Sem Dis Othe		n Arbor							
	Rec Lab Ind		logical Station mp Davis				<u> </u>			
	Graded Section	S/U Ext	ension							
	Lec Sem Dis Othe	er Course Is Y Grade	ed 🗆		ourse: Attach a regular gradu	nomination if Cognizan	t Faculty			
			Approved Date			ed By: X Home Dep	t. Cross-	listed Dept.		
	Approval Info Appr		.ppi oveu Dale	_	300.1110	,. =				
				_	Departi	ment Chair Name	Chair S	Signature		
	☐ Faculty			Home D		& Science				
	Cross listed Unit 1			Cross-	listed CHEM					
	Cross listed Unit 2			De	pt(s). Earth a	nd Envir Sci		.		

Form Number	
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		J
SUPPORTING STATEMENT		
Updated CARF in support of new department name and new curriculus	m	

		•••••
		 •••••
		 •••••
Are any special resources or facilities required for this course?	Yes X No	
Detail the Special requirements		
Detail the Special requirements		

THE UNIVERSITY OF MICHIGAN COLLEGE OF COURSE Approval Request						ENGINEER	RING	Form Number	267	4	
			ge Curriculum C	Committee, 1420	ng Center E	Building		10/14/20		7	
		equested	Comp	lete the follow	ing sections:			Date	10/14/20	15	
	New C Modifie	ourse cation of Existing Co	N C	ourses - B & C				Effective Term	Winter 2	2016	
		on of Course	Modifie	cations - A mod	dified informati	on, B & C	completely		M 11-4		_
			Deletio	ons - A & C co	mpletely			Course Offer Free	I ☐ Indef		nlv
		RENT LISTING					QUESTED	LISTING			
	Home De	epartment		C	ourse Number	Home De	partment			Course	e Number
	AOSS A	tmos, Oceanic &	& Space Sci		474	CLIMAT	E Climate	e & Meteorology		474	1
	Cross List	ed Course Informati	on			Cross List	ed Course I	nformation			
						EARTH	Earth and	Environmental Sc	iences	474	4
	Course Ti	tlo				Course T	itla				
	Course 11	ue						and Climata Chana			
		Time Sched					Time Scheo	s and Climate Chang	е		
	TITLE ABBRE-	Max = 19 Spaces Transcript				TITLE ABBRE-	Max = 19 Spa	ices Ice and Climate			
	VIATION	Max = 20 Spaces				VIATION		ces Ice and Climate			
	Course De	escription						r Official Publication (M			
								mass balance of ice th mathematical theo		•	
								flow and current	nies descri	oing no	wice
								ation. The course into	egrates lec	tures,	
						assignments and discussion of journal articles.					
	PROG	RAM	с Пе П	g 🗌 i 🗌 k		PROG	RAM	⊠а □с □е 🕽	√g ⊠i	Χk	
	OUTCO		d 🗌 f 🗌	ň □j □		OUTC	OMES:		∫h □j		
	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course ● Tech Elective					
	Prereq					Prereq	Math 115	and 116			
	O Enforce O Advised					EnforceAdvised					
	Credit	-				Credit					
	Restrictions					Restrictions	1	. 124			
	☐ Undergrad	Level of Credit	lon-Rokhm Grad		Ins/Wk	☐ Undergrad	Level of C	U	Credit Hours	Conta Hrs/V	
	Rackham	Grad All Credit t m Grad Rckhm Gr	Non-Rckhm Grad types ad w/add'l Work	Min Max	Number	☐ Rackham ☐ Non-Rckh	Grad X m Grad □	All Credit types Rckhm Grad w/add'l Work	Min Max	Numb	er
_	☐ Non-Rckh ☐ Ugrad or F	Rokhm Grad			of Wks		cknm Grad		3 3	of Wk	-
C.		oility (Indi Research,	Dir. Study, Dis	sertation: Is this	s course repeata		O Hours?	Max Times?	Can it be re in the same		O Yes
_	Class T			ading Local			ant Faculty N. Bassis	y Member:	Title	ant Pro	fooos
Ш	Rec				nn Arbor iological Station	Delethy	N. Dassis		Assisi	antrio	1162201
	Graded	Section		P/F C	amp Davis						
	⊠ Lec		_ Other =	_	xtension	Grad C	ourse: Attac	h nomination if Cogniza	ant Faculty		
	Rec	Lab Ind		Course Is Y Grad		is not a	a regular gra	duate faculty		- 8-4- 1	D4
		val Info	Approved by	Name	Approved Date	9	Subm	itted By: Home De	:pr. ∐ Cros	s-listed	⊔ер≀.
	Li Cui	rriculum Comm.				_	Depai	rtment Chair Name	Chair	Signat	ure
	☐ Fac	culty				Home D	ept. Clima	te & Space			
	☐ Cro	ss listed Unit 1				Cross-	earth Earth	and Envir Sci			
	☐ Cro	ss listed Unit 2					ot(s)				

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UPPORTING STATEMENT		
pdated CARF in support of new department name and new curriculu	m	
	DV MN-	
any special resources or facilities required for this course?	☐ fes ⊠ No	
etail the Special requirements		

THE UNIVERSITY OF MICHIGAN COLLEGE OF Course Approval Request					ENGINEE	RING	Form Number	267	6		
	College Curriculum Committee, 1420 Lurie Engineering Action Requested						Building	Date	10/14/20	15	7
		•	Comp	lete the follow	ving sections:			Date	10/14/20	-	_
	New C Modifice	ourse cation of Existing Co	ourse New C	Courses - B & 0	Completely			Effective Terr	m Winter 2	:016	
	ODeletio	on of Course			dified informati	on, B & C	complete		_ Indefi	initely	_
	۸ ۵۰۰۰		Deletio	ons - A & C co	ompletely	D 85		Course Offer Fre	One t		ily
		RENT LISTING			Course Number			LISTING		Course	e Number
		epartment		C		Home De					
_		tmos, Oceanic 8			475			te & Meteorology		475	,
Χ		ed Course Informati						Information			
		N Environmental		Engin	475			nmental Sciences &	≟ Engin	475	
	GEOSC	I Geological Scient	ences		475	EARTH	Earth an	nd Envir Sci		475)
	Course Ti	tle				Course 7	ïtle				
						Earth Sy	stem Inter	ractions			
	TITLE	Time Sched Max = 19 Spaces				TITLE	Time Sch	led Fauth Country late	ac		
	ABBRE- VIATION	Transcript				ABBRE- VIATION	Max = 19 Sp Transcript				
	Course De	Max = 20 Spaces						t baces Earth Systm Intr or Official Publication (N		(s)	
								on open-ended resea			
								dels from Earth Syster			
								xample, surface chara			
								atmosphere exchange			
						observations. Numerical experiments will promote further understanding and interpretation of earth system interactions,					
								scientific communica			
	OUTCO		c	g ∏i ∏k ∣h ∏j	i .	OUTC			⊠g ⊠i ∐h ∐j	⊠ k	
	Degree Requirer			O Free Elective O Tech Elective		Degree Require	ments (Degree Requirement Core Course	O Tech Ele		Other .
	Prereq O Enforce	.d				Prereq Enforce		tanding in science or en	gineering		
	O Advised					O Advised					
	Credit Restrictions					Credit Restrictions					
		Level of Credit			Contact	reconiciono	Level of (Credit		Conta	
	☐ Undergrad		Non-Rckhm Grad types ad w/add'l Work		Hrs/Wk	☐ Undergra	i only	Ugrad or Non-Rokhm Grad	Credit Hours Min Max	Hrs/V	
	Rackham Non-Rckh Ugrad or F	m Grad Rokhm Gr Rokhm Grad	ad w/add'l Work		Number of Wks	□ Non-Rckh	m Grad E Rckhm Grad	☑ Ugrad of Non-Rokhm Grad ☑ All Credit types ☑ Rokhm Grad w/add'l Work	4 4	Number of Wks	er s 14
C.		oility (Indi Research,	Dir. Study, Dis			ıble? ⊙ N		? Max Times?	Can it be re	epeated	○ Yes ○ No
O.	Class T		Gı	rading Loca	ition	Cogniz	ant Facul	Ity Member:	Title		
	Lec Rec	Sem Dis Lab Ind			nn Arbor				_		
	Graded				Siological Station Camp Davis				_		
	X Lec				xtension	010	ouros: At	ach nominati 'f O- '	ant For-it		
	Rec			Course Is Y Gra	ded 🗆			ach nomination if Cogniz raduate faculty			
	Approv	val Info	Approved by	/ Name	Approved Date	•	Subr	mitted By: Nome D	ept. Cros	s-listed [Dept.
	☐ Cui	riculum Comm.				┙	Dena	artment Chair Name	e Chair	Signat	ure
	ПБ	sults.				Home D		ate & Space	, Jilaii	Jigilat	
	☐ Fac	suity iss listed Unit 1						ironmental Sciences 8	& Engin		
		ss listed Unit 2				Cross-	ot(s). Eart	h and Envir Sci	9*'		

Form Number	
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SUPPORTING STATEMENT		
Updated CARF in support of new department name and new curriculu	m	
re any energial resources or facilities required for this source?	□ Vos ▼ No	
are any special resources or facilities required for this course?	les Mino	
Detail the Special requirements		

	THE UNIV	/ERSITY OF MICHIGAN Course Appro		ENGINEER	RING	Form Number	2698	
		ırriculum Committee, 1420 L	urie Engineerir	ng Center E	Building	Date	10/20/2015	
	Action Requested New Course	Complete the followi	ng sections:			Dute	10/20/2010	_
	Modification of Existing Course	New Courses - B & C				Effective Term	Winter 2016	
	O Deletion of Course	Modifications - A mod		on, B & C			☑ Indefinitely	_
		Deletions - A & C con	npietely			Course Offer Freq	One term o	nly
	A. CURRENT LISTING		Ni		QUESTED LI	STING	0	- Ni
	Home Department		urse Number	Home Dep				e Number
	AOSS Atmos, Oceanic & Sp	ace Sci	476			& Meteorology	47	6
	Cross Listed Course Information				ed Course Info	ormation		
П	Course Title			Course T	ïtle			
ш				Ocean D	ynamics and	Climate		
	TITLE Time Sched Max = 19 Spaces			TITLE ABBRE	Time Sched Max = 19 Spaces	Ocean Dynamics		
	VIATION Transcript Max = 20 Spaces			VIATION	Transcript Max = 20 Spaces	Ocean Dynamics		
\Box	Course Description			Course De		official Publication (Ma	x = 50 words)	
				climate. thermoha	Theory and o	oceanography and bservations of the von, vortices and pla	wind-driven and	ean in
	OUTCOMES: b d	e g i k f h j irement O Free Elective	O Other	PROG OUTCO Degree	OMES:	a c e l b d f	g Xi k h j	O Other
	Requirements O Core Course	Tech Elective	Outlet	Require			Tech Elective	Outer
	Prereq AOSS 401 or AOSS 5	51		Prereq		01 or CLIMATE 551 C	R SPACE 551	
Χ	Enforced Advised			EnforceAdvised				
	Credit			Credit				
	Restrictions			Restrictions	1	100		
	Level of Credit Undergrad only Rackham Grad Non-Rckhm Grad Ugrad or Rckhm Grad Ugrad or Rckhm Grad	khm Grad Credit Hours Hr	ontact s/Wk umber f Wks	Undergrad Rackham Non-Rckh	Level of Cred d only Ug Grad X Ali m Grad Rockhm Grad		Credit Hours Hrs/ Min Max 4 4 9 0 W	Wk 4
C.	Repeatability (Indi Research, Dir. S	Study, Dissertation: Is this	course repeata	ble? ⊙ N		Max Times?	Can it be repeated in the same term?	
	Class Type(s)	Grading Locati			ant Faculty N	Member:	Title	
Ш	X Lec Sem Dis Oth Rec Lab Ind		n Arbor ological Station	John P.	Boyd		Professor	
	Graded Section	☐ P/F ☐ Ca	mp Davis	<u> </u>				
	Lec	her S/U Ex	tension	Grad C	ourse: Attach r	nomination if Cogniza	nt Faculty	
	Rec Lab Ind	Course Is Y Grade	ed 🗆		a regular gradu	ate faculty		
	Approval Info App	proved by Name	Approved Date	•	Submitte	ed By: 🛛 Home Dep	ot. Cross-listed	Dept.
	Curriculum Comm.				Departn	nent Chair Name	Chair Signa	ture
	☐ Faculty			Home D		and Space		-
	Cross listed Unit 1			1				
	Cross listed Unit 2			Cross-l	ot(s)			

orm	Number
2	698

SUPPORTING	STATEMENT

Updated CARF in	support of new depa	irtment.name.char	nge.and.new.ci	ırriculum.	 	
	sources or facilitie	es required for thi	is course?	☐ Yes 🔀 No		
etail the Special r	equirements					
•••••					 	
•••••					 •••••	

	THE UNIVERSITY OF MI Cool College Curriculum Commi	urse Approval Request		Form Number	2734
	Action Requested	tri Setati ili Sisi		Date	11/30/2015
	New Course	the following sections es - B & C completely		Effective Term	
		ns - A modified informat	tion R&C completely		
	Deletions -	A & C completely	283	Course Offer Freq	Indefinitely □ One term only
	A. CURRENT LISTING	0 11 1	B. REQUESTED I	LISTING	Course Monthson
	Home Department	Course Number	Home Department		Course Number
	AOSS Atmos, Oceanic & Space Sci	478	CLIMATE Climate	& Meteorology	478
	Cross Listed Course Information		Cross Listed Course In	formation	
_	Course Title		Course Title	23 25 54	
_			Engineering for Space	ce Environment	
	TITLE Time Sched Max = 19 Spaces		TITLE Time Sched Max = 19 Space	es	
	ABBRE- VIATION Transcript Max = 20 Spaces		VIATION Transcript Max = 20 Space		
_	Course Description			Official Publication (Max	(= 50 words)
			not only the physics	of the drivers of spac	isidered. We discuss e weather, bur also the design and operation.
	PROGRAM a c e g OUTCOMES: b d f h]i □k]j		Xa □c ⊠e ⊠ □b □d □f ⊠	
	Degree Course O Free Requirements O Core Course O Tech	Elective O Other		Degree Requirement Core Course C	Free Elective O Other Tech Elective
	Prereq			raduate standing	Di B
	O Enforced O Advised		O Enforced Advised		
_	Credit		Credit Restrictions		
	Restrictions Level of Credit Undergrad only Rackham Grad Non-Richtm Grad	t Hours Hrs/Wk Max Number of Wks	Level of Cre	grad or Non-Rokhm Grad Cr	redit Hours Alin Max 4 4 4 Contact Hrs/Wk 4 Number of Wks 15
c.	Repeatability (Indi Research, Dir. Study, Dissertation		ble? Yes Max		an it be repeated Yes the same term? No
-	Class Type(s) Grading	Location	Cognizant Faculty I	Member:	Title
	X Lec	Camp Davis	Susan Lepri		Associate Professor
	X Lec Sem Dis Other Course	☐ Extension Is Y Graded ☐		nomination if Cognizant	Faculty
	Approval Info Approved by Name Curriculum Comm.	Approved Date		uate faculty ed By: Home Dept. ment Chair Name	Cross-listed Dept.
	Faculty Cross listed Unit 1		Home Dept. Climate Cross-listed	& Meteorology	MM elburn
	Cross listed Unit 2		_ Dept(s)		

					Form Number 2734	
IPPORTING STATEME	NT					
Ipdated CARF in	support of ne	w curriculun	n, subject na	ame and r	new departm	ent
ame.						

any special resources o	r facilities required	I for this course?		***************************************		
		I for this course?	☐ Yes ☐ No			
		I for this course?				
any special resources o tail the Special requiremen		I for this course?				
		I for this course?				
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		THE	UNIVERSITY		- COLLEGE OF	ENGINEE	RING	Form Number	2678	;	
		Colleg	ge Curriculum (oval Request Lurie Engineerii	ng Center I	Building				
	Action R	equested	Comp	loto the follow	vina coctions:			Date	10/14/20	15	
	O New C	course cation of Existing Co	N C	ourses - B & C	ving sections: Completely			Effective Term	Winter 2	016	
		on of Course			dified informati	on, B & C	completel				
			Deletio	ons - A & C co	mpletely			Course Offer Fred	I ☐ Indefin	,	
	A. CUF	RENT LISTING				B. RE	QUESTED	LISTING	☐ One to	arm only	
	Home De	epartment		С	ourse Number	Home De	partment			Course Nun	nber
	AOSS A	tmos, Oceanic 8	& Space Sci		480	CLIMA ⁻	ΓΕ Climate	e & Meteorology		480	
П	Cross List	ed Course Informati	on			Cross Lis	ted Course	Information		-	
						NRE Na	t Resourc	ces & Environment		480	
						L .					—
П	Course Ti	tle				Course "					
ш		Time Sched	+					ne Move to Action			
	TITLE ABBRE-	Max = 19 Spaces				TITLE ABBRE-	Time Sche Max = 19 Spi	d Clim Change Act	ion		
	VIATION	Transcript Max = 20 Spaces				VIATION		ces Clim Change Act			
	Course D	escription						r Official Publication (Ma			
								ty are affected by clin			
								conomics, public heal neering, journalism, r		-	
								ections of these comn			,,,
								l and contextual elem			
						effective	participation	on in the adaptation to	o climate ch	ange.	
	PROG	RAM a	с е	g 🗌 i 🗌 k		PRO	SRAM	⊠a ⊠c □e Þ	g ⊠i [٦,	_
	OUTCO	MES: b	d 🗌 f 🗌	h □j		OUTC	OMES:	⊠b ⊠d ⊠f ▷	∖h ⊠j		
	Degree Requirer			Tech Elective	O Other	Degree Require	ments O		O Tech Elec		ier
_	Prereq O Enforce	od.				Prereq O Enforce		Graduate Standing, Ma	th 116		
Ш	O Advised					Advised					
	Credit Restrictions					Credit Restrictions					_
		Level of Credit			Contact		Level of C		0 1711	Contact	\equiv
$\overline{}$	Undergrad	d only ☐ Ugrad or N Grad ☐ All Credit t	lon-Rckhm Grad ypes ad w/add'l Work	Min Max	łrs/Wk	Undergra	d only Grad X	Ugrad or Non-Rokhm Grad All Credit types Rokhm Grad w/add'l Work	Credit Hours Min Max		3
Ш	☐ Non-Rckh ☐ Ugrad or F	m Grad ⊔ Rckhm Gr Rckhm Grad	ad w/add'l Work		Number of Wks	☐ Non-Rcki ☐ Ugrad or	m Grad Rckhm Grad	Rckhm Grad w/add'l Work	3 3	Number of Wks Te	erm
C.	Repeatal	oility (Indi Research,	Dir. Study, Dis	sertation: Is this	s course repeata	ıble? ○ \		Max Times?	Can it be rep		
U.	Class T			ading Loca	tion			y Member:	Title		_
	X Lec Rec	Sem Dis Lab Ind			nn Arbor	Richard	B. Rood		Profes	sor	
		Section			iological Station amp Davis	<u> </u>					
	☐ Lec				xtension	0 10	A/-		-4 5		
	Rec			Course Is Y Grad	ded 🗆			ch nomination if Cogniza aduate faculty	int racuity		
	Appro	val Info	Approved by	Name	Approved Date			itted By: 🛮 Home De	pt. Cross	-listed Dept.	
		rriculum Comm.					Dono	rtmont Chair Nama	bhair i	Signature	
						٦.,		rtment Chair Name	Chair	aynature	
	Fac	culty oss listed Unit 1			1		Not F	te & Space	nont		
		oss listed Unit 2				- Cross-	pt(s)	Resources & Environn	ieilt		

2678	

		J
UPPORTING STATEMENT		
Jpdated CARF in support of new department name and new curriculu		
poated CARF in support of new department name and new cornicula	UJ	
e any special resources or facilities required for this course?	Yes X No	
etail the Special requirements		

	THE UNIVERSITY OF MICHIGAN COL Course Approval I College Curriculum Committee, 1420 Lurie	Request		Form Num	2679	
	Action Requested			'	Date 10/14/2015	
	New Course Modification of Existing Course Deletion of Course Deletion of Course Modifications - A modified	npletely		Effective letely	Term Winter 2016	<u> </u>
	Deletions - A & C comple A. CURRENT LISTING			Course Offer	Freq ☐ Indefinite ☐ One term	
		Number	Home Departmen		Co	urse Number
	AOSS Atmos, Oceanic & Space Sci 498			mate & Meteorolog		498
x	Cross Listed Course Information		Cross Listed Cou			100
				e Science & Engine	eering 4	498
x	Course Title		Course Title	An along someway		
_	Practicum in Atmospheric, Oceanic and Space Sciences		Practium in Clir	nate and Space Scie	nce	
	TITLE Time Sched Max = 19 Spaces		TITLE Time	Sched 9 Spaces		
	VIATION Transcript Max = 20 Spaces		VIATION Trans Max = 2	cript 0 Spaces		
х	Course Description			n for Official Publication		-0.000
	Students taking this course will participate in research and/o engineering tasks. Supervision will be undertaken by faculty engineers of the AOSS department. Reporting requirements a final written summary. Diverse tasks include aircraft space and rocket payload design field campaign support calibration simulation test. Students will join an active research program AOSS for a given semester.	and include craft	and/or engine faculty and en Reporting req Diverse tasks design field ca Students will j	ng this course will pering tasks. Super gineers of the Clim uirements include a include aircraft spa impaign support ca poin an active resea given semester.	vision will be unde nate & Science de a final written sum acecraft and rocke alibration simulation	ertaken by partment. mary. et payload on test.
	PROGRAM a c e g i k OUTCOMES: b d f h j		PROGRAM OUTCOMES:	a c e b d f	= = =	
	Degree O Degree Requirement O Free Elective O O Requirements O Core Course O Tech Elective	ther	Degree Requirements	O Degree Requireme O Core Course	ont O Free Elective O Tech Elective	O Other
	Prereq O Enforced	ŀ	Prereq Permi Enforced	ssion of instructor		
<u>ال</u>	O Advised		O Advised			
	Credit Restrictions		Credit Restrictions			
	Level of Credit Undergrad only Ugrad or Non-Richtm Grad Rachham Grad I Gredit types Non-Richtm Grad Richtm Grad Wiedd'l Work Ugrad or Richtm Grad Ugrad or Richtm Grad Visigat or Richtm Grad		Level of Undergrad only Rackham Grad Non-Rickhm Grad Ugrad or Rickhm Gra	Ugrad or Non-Rickhm Gra All Credit types Rickhm Grad wladdi Work	Credit Hours Min Max 1 2 Num of W	
. [Repeatability (Indi Research, Dir. Study, Dissertation: Is this course	e repeatab	ole? Ole Yes Ma	rs? 8 Times?	Can it be repeate in the same term	
_	Class Type(s) Grading Location		Cognizant Fac	ulty Member:	Title	
_	□ Lec □ Sem □ Dis □ Other □ A-E □ Ann Arbo □ Rec □ Lab □ Ind □ CR/NC □ Biologica					
	Graded Section P/F Camp Da	evis				
	Lec Sem Dis Other S/U Extension Rec Lab Ind Course Is Y Graded □	,		tach nomination if Cog graduate faculty	nizant Faculty	
	Approval Info Approved by Name Approv	ved Date		bmitted By: Home	Dept. Cross-listed	d Dept.
	Curriculum Comm.	- Vermitte		partment Chair Nar	me Chair Signa	ature
	Faculty		Home Dept. Clir	nate & Space		
	☐ Cross listed Unit 1 ☐ Cross listed Unit 2		Cross-listed			
	- 0.000 listor offit 2		Dept(s)			

				F	orm Number	
					2679	
PPORTING STATE						
pdated CARF in sup	port of new departm	nent.name.and.new.	curriculum			

any special resource	es or facilities require	red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
any special resource		red for this course?	Yes No			
		ed for this course?	Yes No			
		red for this course?	☐ Yes ☐ No			
		ed for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	☐ Yes ☐ No			
		red for this course?	Yes No			

	THE UNIVERSITY OF MICHIGAN - COLLEGE OI Course Approval Requests Action Requested New Course Modification of Existing Course Modification of Course Deletion of Course A. CURRENT LISTING Home Department AOSS Atmos, Oceanic & Space Sci Modification - A Use Number AOSS Listed Course Information	Form Number ring Center Building Date 11/4/2015 S: Effective Term Winter 2016
_	Course Title	Course Title
_		Directed Study
	TITLE Time Sched Max = 19 Spaces	TITLE Time Sched Max = 19 Spaces Directed Study
	VIATION Transcript Max = 20 Spaces	VIATION Transcript Max = 20 Spaces
	Course Description	Course Description for Official Publication (Max = 50 words)
	PROGRAM a c e g i k OUTCOMES: b d f h j Degree O Degree Requirements O Core Course O Tech Elective	PROGRAM a c e g i k OUTCOMES: b d f h j Degree O Degree Requirement O Core Course O Tech Elective
	Prereq	Prereq Permission of instructor
\neg	O Enforced	O Enforced
7	O Advised	O Advised
٦	Credit Restrictions	Credit Only 4 credits can be applied as a Technical Elective Restrictions
	Level of Credit Undergrad only Rackham Grad Non-Rickham G	Level of Credit Undergrad only Upgrad or Non-Rickhim Grad Non-Rickhim Grad Non-Rickhim Grad Non-Rickhim Grad Non-Rickhim Grad Upgrad or Rickhim Grad Non-Rickhim Grad Non-Rickhi
	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata	e Yes Max Max Can it be repeated € Yes In the same term? ○ No
	Class Type(s)	Cognizant Faculty Member: Title
	Rec Lab Ind Course Is Y Graded	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 Home Dept. Climate & Space
	☐ Cross listed Unit 1 Cross listed Unit 2	Cross-listed

					Number	
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IPPORTING STATE	MENT			-		
pdated CARF in suppor	t.of.new.department.r	name.and.new.curricu	ılum			

		***************************************				******
any special resource	s or facilities requir	ed for this course?	☐ Yes ☐ No			
any special resource	s or facilities requir					
any special resource	s or facilities requir		☐ Yes ☐ No			
any special resource	s or facilities requin					
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	THE UNIVERSITY OF MICHIGAN COLLEGE O Course Approval Request	F ENGINEERING Form Number	2681		
	College Curriculum Committee, 1420 Lurie Engineer	ring Center Building	40/44/0045		
	Action Requested Complete the following sections	Date s.	10/14/2015		
	New Course Modification of Existing Course New Courses - B & C completely	Effective Term	Winter 2016		
	Deletion of Course Modifications - A modified information		☑ Indefinitely		
	Deletions - A & C completely	Course Offer Freq	☐ One term only		
	A. CURRENT LISTING	B. REQUESTED LISTING			
	Home Department Course Number	Home Department	Course Number		
_	AOSS Atmos, Oceanic & Space Sci 501	CLIMATE Climate & Meteorology	501		
Ш	Cross Listed Course Information	Cross Listed Course Information			
\Box	Course Title	Course Title			
Ш		Seminars in Climate, Atmospheres	& Space Sciences		
	TITLE Time Sched Max = 19 Spaces ABBRE-	TITLE Time Sched Max = 19 Spaces			
	VIATION Max = 20 Spaces	VIATION Transcript Max = 20 Spaces			
X	Course Description	Course Description for Official Publication (Max	= 50 words)		
ننا	Current Research efforts will be presented by graduate	Current Research efforts will be pr	esented by graduate		
	students and faculty dealing with all phases of the	students and faculty dealing with a	ll phases of the		
	Climate, Atmospheric and Space Sciences	climate, atmospheric and space sci	ences		
	PROGRAM a c e g i k OUTCOMES: b d f h j		g ∏i ∏k h ⊠j		
	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective O Other	-	Free Elective O Other Tech Elective		
_	Prereq O Enforced	Prereq Graduate Standing Prereq Graduate Standing			
Ш	O Advised	O Advised			
\Box	Credit Restrictions	Credit Restrictions			
	Level of Credit Llored or Non-Rokhm Grad Credit Hours Hrs/Wk	Level of Credit	redit Hours Contact Hrs/Wk 1		
	Rackham Grad All Credit types Min Max		Min Max Number		
Ш.	Ugrad or Rokhm Grad of Wks of Wks	O M	1 1 of Wks 15		
C.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repea	No Hours? 16 Times?	Can it be repeated • Yes n the same term? No		
$\overline{}$	Class Type(s) Grading Location □ Lec ☑ Sem □ Dis □ Other □ □ A-E ☑ Ann Arbor	Cognizant Faculty Member: Mark Moldwin	Title Professor		
ш	☐ Lec Sem ☐ Dis ☐ Other ☐ A-E		FIGUESSOI		
	Graded Section P/F Camp Davis				
	☐ Lec ☒ Sem ☐ Dis ☐ Other ☐ S/U ☐ Extension ☐ Rec ☐ Lab ☐ Ind Course Is Y Graded ☐	Grad Course: Attach nomination if Cognizant Faculty			
		is not a regular graduate faculty ite Submitted By: Home Dept	. Cross-listed Dept.		
	Approval Info Approved by Name Approved Da Curriculum Comm.				
	_	Department Chair Name	Chair Signature		
	☐ Faculty ☐ Cross listed Unit 1	Home Dept. Climate & Space			
	Cross listed Unit 1	Cross-listed			
		Dept(s).			

2681

JPPORTING STATEMENT		
Ipdated CARF in support of new department name and new curricult	m	
e any special resources or facilities required for this course?	X Yes ☐ No	
etail the Special requirements		
cian the openia requirements		
The class uses teleconference tools to connect the Central	Campus with the North Campus	
aissuiggugsg.asassauaisasaisstvviibtvsviiiitsitiiss.siiität	·~mmhms:wmm:nrs:130nm://mmhms::	

Action Requested	THE UNIVERSIT	Course Ap	AN COLLEGE OF pproval Request 420 Lurie Engineer			Form Numl	ber	/2015
New Course Modification of Exis Deletion of Course A. CURRENT LIST	ting Course New Mod Dele	Courses - B	Rowing sections & C completely modified informat completely	tion, B & C	50	Effective T	Term Winte	definitely
Home Department			Course Number	Home Dep	-			Course Num
AOSS Atmos, Oce	anic & Space S	ci	524			te & Meteorology	v	524
Cross Listed Course In		UI .	524	-		Information	у	324
ENSCEN Environn		& Engin	524			nmental Science	es & Engin	524
Course Title				Course Ti	tle			
				General C				
TITLE Time Sched Max = 19 Space				TITLE	Time Sche Max = 19 Sp	d aces General Circu	ulation	
VIATION Transcript Max = 20 Space	os.			ABBRE- VIATION	Transcript Max = 20 Spi	0 0:		
Course Description				Course De		r Official Publication	(Max = 50 w	ords)
				and result	s from ge	eneral circulation n	model simula	ations.
PROGRAM OUTCOMES:	a	g □i □]h □j	k	PROGE		□a □c □e □b □d □f	□g □i	□ k
Degree O De Requirements O Co	b d f gree Requirement re Course	h j O Free Electiv O Tech Electiv	ve O Other	Degree Requirem	MES:	b d f Degree Requirement Core Course	nt O Free E O Tech E	lective O Othe
Degree O De Requirements O Co	b d f gree Requirement	h j O Free Electiv O Tech Electiv	ve O Other	OUTCO	MES:	b d f	nt O Free E O Tech E	lective O Othe
Degree O De Requirements O Co Pereq Previous or D Enforced	b d f gree Requirement re Course	h j O Free Electiv O Tech Electiv	ve O Other	Degree Requirem Prereq © Enforced	MES:	b d f Degree Requirement Core Course	nt O Free E O Tech E	lective O Othe
OUTCOMES: Degree Degree Previous or Defice Deficient On Enforced Advised Previous Or Deficient On Enforced Degree	b d f gree Requirement re Course concurrent with AC	h j O Free Electiv O Tech Electiv	ve O Other	Degree Requirem Prereq © Enforced O Advised Credit Restrictions	ments O Previous	b d f Degree Requirement Core Course or concurrent with C	h j	lective O Othe lective C or better Contact Hrs/Wk 3 Number
OUTCOMES: Degree Degree Degree Previous or Definitions Level of Cred Undergoad only Degree	b d f gree Requirement re Course concurrent with AC concurrent with AC child from Grad Chedit types when Grad Ward Work	Free Electiv O Tech Electiv OSS 401 Credit Hours Min Max	Contact Hrs/Wk Number of Wks	Degree Requirem Prereq Senforced Advised Credit Restrictions Restrictions Restrictions Versel Non-Richtm Versel Non-Richtm Versel Non-Richtm Versel Non-Richtm Versel Non-Richtm	MES: Onents O Previous Previous Grad Grad Hours?	b d f Degree Requiremer Core Course or concurrent with C redit Ugrad or Non-Richtm Grad All Credit types Richtm Grad wledd? Work Max Times?	nt O Free E O Tech E CLIMATE 401; Credit Hou Min Ma 3 3 3 Can it be	lective O Othe lective C or better Contact Hrs/Wk 3 Number
Degree Degree Previous or Perior Previous or Period Previous or Perior Previous or Period	b d f gree Requirement re Course concurrent with AC concurrent with AC concurrent with AC check types check them Grad whadd! Work carch, Dir. Study, Did Gis Other G	Free Electiv O Free Electiv O Tech Electiv SSS 401 Credit Hours Min Max Sesertation: Is the strategy of the	Contact HrsWk Number of Wks An Arbor Biological Station Camp Davis Extension	Degree Requirem Prereq Senforced Credit Restrictions Ludetergrad Flackham Gradham Gr	Previous (Level of Ci Previous (Level of Ci Previous (Level of Ci Previous (Pre	Degree Requiremer Core Course or concurrent with C	in i	lective Other C or better C or better C or wiss 3 Number of Wiss 13 repeated Yene term? No
Degree De Requirements Co Requirements Co Co Prereq Previous or Deformed De	b d f gree Requirement re Course concurrent with AO iit mad or Non-Richm Grad Credit types changed Work arch, Dir. Study, Dir. dir. dir. dir. dir. dir. dir. dir. d	Free Electiv O Free Electiv O Tech Electiv SSS 401 Credit Hours Min Max Sesertation: Is the strating Loc A-E GRANC P/F S/U Course Is Y Grance Course Is Y Grance	Contact HrsWk Number of Wks An Arbor Biological Station Camp Davis Extension	Degree Requirem Prereq Senforced Advised Credit Restrictions Lundergrad Restrictions Lundergrad G Records G S Uprad or RG Uprad or RG Cogniza	ments O Previous of Comply and	Degree Requirement Core Course or concurrent with C	int O Free E O Tech E LIMATE 401; credit Hou Min Ma 3 3 3 Can it be in the san Titli	lective O Othe Clective C or better A Number of Wks 3 Number of Wks 13 repeated Yes Poss-listed Dept.
OUTCOMES: Degree O De Requirements O Co Prereq Previous or D Enforced O Advised Level of Cred D Advised Undergrad only Racebam Gred North Cred D Advised O Repeatability (Indi Rese Class Type(s) Lec Sem D Rec Lab In Graded Section	b d f gree Requirement re Course concurrent with AO iit mad or Non-Richm Grad Credit types changed Work arch, Dir. Study, Dir. dir. dir. dir. dir. dir. dir. dir. d	Free Electiv O Free Electiv O Tech Electiv SSS 401 Credit Hours Min Max Sesertation: Is the strating Loc A-E GRANC P/F S/U Course Is Y Grance Course Is Y Grance	Contact HrsWk Number of Wks atlon Ann Arbor Biological Station Camp Davis Extension aded	Degree Requirem Prereq Senforced Advised Credit Restrictions Lundergrad Restrictions Lundergrad G Records G S Uprad or RG Uprad or RG Cogniza	Previous Previo	Degree Requiremer Core Course or concurrent with C redit Ugrad or Non-Richtm Grad All Credit hyes Rothm Grad windort Work Max Times? r Member:	int O Free E O Tech E LIMATE 401; d Credit Hou Min Ma 3 3 3 Can it be in the sar Titli	lective O Othe clective C or better A Mark Mark Mark Mark Mark Mark Mark Mark

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JPPORTING STA					
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any special resou	urces or facilities r	required for this cou	irse? Yes No		*****
any special resou	urces or facilities r	required for this cou	urse?		
e any special resou stail the Special requ	urces or facilities r	required for this cou	irse?		
any special resou	urces or facilities r	required for this cou	urse?		
any special resou	urces or facilities r	required for this cou	urse?		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
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any special resou	urces or facilities r	required for this cou	irse? Yes No		
any special resou	urces or facilities r	required for this cou	rse? Yes No		
any special resou	urces or facilities r	required for this cou	irse? Yes No		
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any special resou	urces or facilities r	required for this cou	irse?		

х	THE UNIVERSITY OF MICHIGAN - COLLEGE OF Course Approval Request College Curriculum Committee, 1420 Lurie Engineeri Action Requested New Course Of Modification of Existing Course Deletion of Course A. CURRENT LISTING Home Department AOSS Atmos, Oceanic & Space Sci Course Approval Request Complete the following sections. New Courses - B & C completely Modifications - A modified information Deletions - A & C completely Course Number Course Number Course Listed Course Information	Form Number Date 10/14/2015 Effective Term Winter 2016
X	Course Title Fluid Dynamics for Atmospheric and Space Sciences TITLE Time Sched Max = 19 Spaces Max = 19 Spaces	Course Title Advanced Fluid Dynamics for Climate and Space Sciences TITLE Time Sched Max = 19 Spaces Advanced Fluid Dynamics
	VARTON Transcript Max = 20 Spaces Course Description	Transcript Mars 20 Spaces Advanced Fluid Dynamics 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.
	PROGRAM OUTCOMES:	PROGRAM OUTCOMES: b d f h j Degree
	Requirements O Core Course O Tech Elective Prereq O Enforced O Advised	Prereq Math 215, Math 216, and Math 450 © Enforced Advised
	Credit Restrictions Level of Credit Undergrad only Ugrad or Non-Rickhm Grad N	Credit Restrictions Level of Credit ☐ Undergrad only ☐ Richer types ☐ Non-Richtm Grad ☐ Nicher types ☐ Nich
c.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeate Class Type(s) Grading Location Lec Sem Dis Other A-A-E Ann Arbor Graded Section P/F Camp Davis Rec Sem Dis Other S/V Graded Approval Info Approved by Name Approved Dat Curriculum Comm.	Cognizant Faculty Member: Title Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty.
	Faculty Cross listed Unit 1 Cross listed Unit 2	Department Chair Name Chair Signature Home Dept. Climate & Space Cross-listed Dept(s).

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		200.	
UPPORTING STATEMENT	'		•
pdated CARF in support of new department name and new curriculum			
			•••••
e any special resources or facilities required for this course?	☐ Yes 🔀 No		
etail the Special requirements			

	THE UNIVERSITY OF MICHIGAN COLLEGE O Course Approval Request	F ENGINEERING 2699			
	College Curriculum Committee, 1420 Lurie Enginee	ring Center Building Date 10/20/2015			
	Action Requested Complete the following sections				
	New Course Modification of Existing Course New Courses - B & C completely	Effective Term Winter 2016			
	O Deletion of Course Modifications - A modified informa				
	Deletions - A & C completely	Course Offer Freq Indefinitely			
	A. CURRENT LISTING	B. REQUESTED LISTING			
	Home Department Course Number	Home Department Course Number			
	AOSS Atmos, Oceanic & Space Sci 563	CLIMATE Climate & Meteorology 563			
	Cross Listed Course Information	Cross Listed Course Information			
		ENSCEN Environmental Sciences & Engin 563			
П	Course Title	Course Title			
ш	Time Sched	Air Pollution Dispersion Modeling			
	TITLE Max = 19 Spaces	TITLE Time Sched Max = 19 Spaces Air Pollut Modeling			
	VIATION Transcript Max = 20 Spaces	VIATION Transcript Max = 20 Spaces			
\Box	Course Description	Course Description for Official Publication (Max = 50 words)			
ш		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: □ a □ c □ e □ g □ i □ k □ b □ d □ f □ h □ j	PROGRAM OUTCOMES: b d f h j			
	Degree ○ Degree Requirement ○ Free Elective ○ Other Requirements ○ Core Course ○ Tech Elective ○ Other	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective			
	Prereq AOSS 463	Prereq CLIMATE 463			
Х	○ Enforced • Advised	O Enforced Advised			
	Credit Restrictions	Credit Restrictions			
	Level of Credit Undergrad only	Level of Credit Undergrad goly			
П	□ Undergrad only □ Ugrad or Non-Rickhm Grad Rackham Grad □ All Credit types □ Non-Rickhm Grad □ Rickhm Grad wladd Work □ Max Number □ of Wks □				
Ш,	Ugrad or Rokhm Grad of Wks	Ugrad or Rickhm Grad 3 3 of Wks			
C.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repea	Hours? Times? In the same term? No			
	Class Type(s) Grading Location	Cognizant Faculty Member: Title			
Ш	X Lec Sem Dis Other X A-E X Ann Arbor Rec X Lab Ind CR/NC Biological Station	n			
	Graded Section P/F Camp Davis	ION			
	Lec Sem Dis Other S/U Extension	Grad Course: Attach nomination if Cognizant Faculty			
	Rec Lab Ind Course Is Y Graded	is not a regular graduate faculty			
	Approval Info Approved by Name Approved Da	- · · · - □ · · · · · · · · · · · · · ·			
	Curriculum Comm.	Department Chair Name Chair Signature			
	□ Eth				
	☐ Faculty ☐ Cross listed Unit 1	Environmental Calangae & Engin			
	Cross listed Unit 2	Cross-listed Environmental Sciences & Engin			

SUPPORTING STATEMENT		
Jpdated CARF in support of new department name change and new o	urriculum.	
re any special resources or facilities required for this course?	Yes No	
Detail the Special requirements		

		THE	UNIVERSITY	OF MICHIGAN Course Appr	- COLLEGE OF oval Request	ENGINEE	RING	Form Number	2700		
			ge Curriculum C		Lurie Engineerii	ng Center E	Building	Date	10/20/20	15	1
	O New C	equested	Comp	lete the follow	ing sections:			Dute	10/20/20		_
	Modific	cation of Existing Co		ourses - B & C				Effective Term	Winter 2	J16	
	O Deletio	on of Course		cations - A moons ons - A & C co	dified informati	on, B & C	completely	/ Course Offer Fred	■ Indefi	nitely	
	A CUR	RENT LISTING	Dolotte	713 71 4 0 00	inplotoly	B. REG	QUESTED		One to	erm onl	у
		epartment		С	ourse Number	Home De				Course	Number
		tmos, Oceanic 8	Space Sci		564			e & Meteorology		564	1
х		ed Course Informati					ted Course I				
7.						ENSCE	N Environ	mental Sciences &	Engin	564	
						SPACE	Space Sc	cience & Engineerir	ng	564	
	Course Ti	tlo				Course 7	itle.				
	Course 11	ue						nd Mesosphere			
	TITLE	Time Sched				TITLE	Time Sched	1 0, , 0 14			
	ABBRE- VIATION	Max = 19 Spaces Transcript				ABBRE- VIATION	Max = 19 Spa Transcript	1000			
	Course De	Max = 20 Spaces					Max = 20 Spa	ces Strat & Meso	ex = 50 words	s)	
								and dynamical prope			ohere
								ause and the turbopa			
								at and radiation budg			
						airglow.	ienc warm	ings, the biennial stra	ilosprieric o	scillatio	и,
	PROGI	RAM a	се	g □i □k		PROC	GRAM	□а □с □е □] g	k	
	OUTCO	MES: b	d 🗌 f 🗌	h □j		OUTC	OMES:	bdf	∫h □j		
	Degree Requirer	nents O Core Co		Free Elective Tech Elective	O Other	Degree Require	ments O		O Free Elec O Tech Elec		Other .
_	Prereq O Enforce	AOSS 464				Prereq O Enforce	CLIMATE	574			
X	Advised					Advised	I				
	Credit Restrictions					Credit Restrictions	None				
ш		Level of Credit		C	Contact		Level of C			Conta	ct
_	Undergrad	l only ☐ Ugrad or N Grad ☐ All Credit t	lon-Rckhm Grad ypes ad w/add'l Work	Min Max	Irs/Wk	☐ Undergra ☑ Rackham	d only	Ugrad or Non-Rokhm Grad All Credit types Rokhm Grad w/add'l Work	Credit Hours Min Max	Hrs/W	
Щ	☐ Non-Rckhi ☐ Ugrad or R	m Grad	ad w/add'l Work		Number of Wks	☐ Non-Rckh ☐ Ugrad or	m Grad Rckhm Grad	Rckhm Grad w/add'l Work	3 3	Number of Wks	er 13
C.	Repeatab	oility (Indi Research,	Dir. Study, Dis	sertation: Is this	s course repeata	ıble? ⊙ Y		Max Times?	Can it be rep in the same		O Yes O No
_	Class T		_	ading Loca		Cogniz	ant Faculty	y Member:	Title		
	Lec Rec				nn Arbor iological Station						
	Graded	Section		P/F C	amp Davis						
	X Lec		Other =	_	xtension			ch nomination if Cogniza	int Faculty		
	Rec			Course Is Y Gra				iduate faculty itted By: Home De	pt. 🛛 Cross	-listed F	Dept.
		val Info rriculum Comm.	Approved by	wame	Approved Date	=		•			
					1	_		rtment Chair Name	Chair	Signati	ure
	Fac					Home D		te & Space	_		
		ss listed Unit 1			+	Cross-	listed Enviro	onmental Sciences &	Engin		
						De	μι(δ)				

2700

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SUPPORTING STATEMENT		
	aussiaulum	
Updated CARF in support of new department name change and new	sumculum.	
re any special resources or facilities required for this course?	Yes No	
Detail the Special requirements		
Detail the Opeda requirements		

		THE	UNIVERSITY	OF MICHIGAN Course Appr	- COLLEGE OF oval Request	ENGINEE	RING		Form Nu	ımber	270	1	
			ge Curriculum C		Lurie Engineerir	ng Center E	Building			Date	10/20/20	115	
		equested	Comp	lete the follow	ing sections:					Date	10/20/20	,,,,	_
	New C Modific	ourse cation of Existing Co	urse New C	ourses - B & C	completely				Effectiv	e Term	Winter 2	2016	
	O Deletio	on of Course			dified informati	on, B & C	completel		0"	_	Indef	initely	_
	۸ ۵۱۱۵		Deletic	ons - A & C co	mpietely	D D E			ourse Off	er Freq	One		ıly
		RENT LISTING			ourse Number		QUESTED	LIS	TING			0	e Number
		epartment		C		Home De							
_		tmos, Oceanic 8			575				Meteorol	ogy		575)
Χ	Cross Liste	ed Course Informati	on			l	ted Course						_
						ENSCE	N Enviror	nmei	ntal Scier	nces & I	Engin	575	5
_	Course Ti	tle				Course 7	itle						
						Air Pollu	ion Monito	oring					
	TITLE	Time Sched Max = 19 Spaces				TITLE	Time Sche		Air Pollutn	Monitor	r		
	ABBRE- VIATION	Transcript				ABBRE- VIATION	Max = 19 Sp Transcript	Jucco					
	Course De	Max = 20 Spaces				l	Max = 20 Sp escription for	aces or Offi	Air P Mon	ation (Max	x = 50 word	ds)	
						l			to the fun				rosol
									ocus on oz				
									ls; operati				
									technique team-ori				
						monitorii		WIII DO	s team-on	enteu ta	SKS IIIVOIV	iiig aii (quanty
							Ü						
		_						_					
	PROGI		c e d d f	g □i □k h □j		OUTC		a		_ e _ f	g ∐i h ∐j	□ k	
	Degree Requirer			Free Elective Tech Elective	O Other	Degree Require			ree Requir e Course		Free Ele Tech Ele		Other
	Prereq	"Previous or cond	current with AO	SS 463, AOSS 5		Prereq	"Previou:	s or c	oncurrent v	vith CLIM	ATE 463, 0	CLIMATE	E 578,
Х	EnforceAdvised					Advised	d NRE 538	0					
	Credit					Credit	Graduate Stud	dents					
	Restrictions					Restrictions	Level of C	?!!					
	☐ Undergrad	Level of Credit	Jon-Rokhm Grad		Irs/Wk	□ Undergra	d only	Ugrad	d or Non-Rokhr		redit Hour	Conta Hrs/V	
	Rackham	Grad ☐ All Credit t m Grad ☐ Rckhm Gr	lon-Rckhm Grad ypes ad w/add'l Work	Min Max	Number	Undergra Rackham Non-Rckh	m Grad L	All Cr Rckhi	edit types m Grad w/add'l	Work	Min Max	Numb	er
_	☐ Non-Rckhi	Rokhm Grad			of Wks	Ugrad or	Rckhm Grad					of Wk	
_	Repeatab	oility (Indi Research,	Dir. Study, Dis	sertation: Is this	s course repeata	ble?		?	Max Times?		Can it be re in the sam		O Yes
C.	Class T	ype(s)	Gr	ading Loca	tion	Cogniz	ant Facul				Title		
	∠ Lec	Sem Dis	Other 🔀	A-E 🛛 A	nn Arbor								
	Rec				iological Station amp Davis								
	Graded Lec				xtension					_	J_		
	☐ Rec			Course Is Y Grad	ded 🗆		ourse: Atta a regular gr		mination if te faculty	Cognizar	nt Faculty		
		val Info	Approved by		Approved Date			nitted		ome Dep	t. 🛛 Cros	s-listed	Dept.
		riculum Comm.					D-		Cl- :	Mana	b.	C: ·	
	_		_			- -			ent Chair	Name	Chair	Signat	ure
	Fac					Home D	ept. Clima						
		ss listed Unit 1			+	Cross-	listed Envir	ronm	ental Scie	nces & l	⊨ng∥n		
					J	De	μι(δ)						

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	2701	

	1 2,01	
SUPPORTING STATEMENT		
Ipdated CARF in support of new department name change and new curriculum.	 	
re any special resources or facilities required for this course?		

				Course Appr	COLLEGE OF oval Request Lurie Engineerii			Form	Number	270		1
	New C Modific	equested ourse cation of Existing Co on of Course	urse New C	ourses - B & C cations - A mo	dified informati		completel	у	Date tive Term	10/20/20 Winter 2	2016	
	A CUB	RENT LISTING	Deletio	ons - A & C co	mpletely	B. REG	QUESTED		Offer Freq	☐ One		у
		epartment		С	ourse Number	Home De		LISTING			Course	Number
		tmos, Oceanic 8	& Space Sci		576			e & Meteor	rology		576	
\neg		ed Course Informati	•				ed Course		- 0,			
						ENSCE	N Enviror	nmental Sc	iences & E	Engin	576	
\neg	Course Ti	tle				Course T	itle					
						Air Quali	y Field Pro	- 1				
	TITLE ABBRE-	Time Sched Max = 19 Spaces				TITLE ABBRE-	Time Sche Max = 19 Spa		l Field Proj			
	VIATION	Transcript Max = 20 Spaces				VIATION	Transcript Max = 20 Spa	aces Air Q FI	ld Prj			
	Course De	escription				Practical measure impleme research tracking,	experience experience ments from ntation and design, sa computeri and report	or Official Pub se in all aspe in the design d data analy ampling, dat ized data ac ing; team-or	lication (Max ects of air q n and plann rsis and inte ta manager quisition ar	uality field ing stage erpretation nent systend proces	through n. Emph ems, sar sing, err	asis on nple or
	PROGI OUTCO Degree	MES: b Degree I	Requirement (g	O Other	PROG OUTCO Degree	OMES:	a c b d	f uirement C	h j Free Elec		Other
	Requirer			Tech Elective	0.11	Require		Core Course		Tech Ele		E 5001
х	Prereq O Enforce O Advised		: 538, AUSS 57	5, OR AUSS 50	3	Prereq O Enforce O Advised	d	E 578, NRE 5	538, CLIMAT	E 5/5, OR	CLIMA	E 303
_	Credit Restrictions					Credit Restrictions	Graduate Stud	lents				
	Undergrad Rackham Non-Rckhr	Grad All Credit t	Non-Rckhm Grad ypes ad w/add'l Work	Credit Hours F	ontact Irs/Wk	Undergrad Rackham Non-Rckh	Level of C d only Grad Grad Rokhm Grad	Ugrad or Non-Ro All Credit types Rokhm Grad w/a		redit Hours Min Max	Conta Hrs/W Numbe of Wks	k 24
C.	Repeatab	ility (Indi Research,	Dir. Study, Dis	sertation: Is this	s course repeata	. O IN	O Hours?			Can it be re		O Yes
_	Class T	ype(s) Sem Dis	_	ading Loca A-E X A	t ion nn Arbor	Cogniz	ant Facult	y Member:		Title		
	Rec Graded Lec Rec	Lab		CR/NC B P/F C	iological Station amp Davis xtension			ch nomination		t Faculty		
	Approv		Approved by	Name	Approved Date				Home Dept	. 🛮 Cros	s-listed D	ept.
	☐ Cur	riculum Comm.					Depa	rtment Ch	air Name	Chair	Signatu	ıre
	□Fac	culty				Home D	ept. Clima	ite & Space				
		ss listed Unit 1 ss listed Unit 2				Cross-	isted Envir	onmental S	ciences & E	ngin		

2702

JPPORTING STATEMENT		
pdated CARF in support of new department name change and new curriculum.		
any special resources or facilities required for this course?	No	
etail the Special requirements		

		THE	UNIVERSITY		- COLLEGE OF oval Request	ENGINEER	RING		Form Number		2703		
			ge Curriculum C		Lurie Engineeri	ng Center E	Building		Date	10	/20/201		1
		equested	Comp	lete the follow	ving sections:				Date	10	7207201		
	New C Modific	ourse cation of Existing Co	N C	ourses - B & 0	-				Effective Terr	n W	inter 20	16	
		on of Course	Modifie		dified informati	on, B & C	complete				Indefini	italy	,
			Deletio	ons - A & C co	mpletely				Course Offer Fre	ч =	One te	•	٧
		RENT LISTING					QUESTE	LIS	STING				
		epartment		C	ourse Number	Home Dep					(Number
		tmos, Oceanic 8			578				Meteorology			578	
Χ		ed Course Informati	on				ed Course						
	EIH				666				Health Science			666	
						ENSCE	N Enviro	nme	ental Sciences	& Eng	jin	578	
	Course Ti	tle				Course T	ïtle						
						l	ion Chem	nistrv					
	TITLE	Time Sched				TITLE	Time Sch	ed	Air Poll Chem/E	IH 66	3		
	ABBRE- VIATION	Max = 19 Spaces Transcript				ABBRE- ·	Max = 19 S	puoco		111 00			
	Course De	Max = 20 Spaces							Air Poll Chem ficial Publication (N	lav – F	() words		
	Course De	SSCIIPROTI				l			ospheric air pollu				
									nermochemistry,				
									eous and particu				e
						consider	ed in term	ns of	their origins and	trans	formatio	ns.	
	PROGI		c e d d f	g □i □k h □j		PROG OUTC			a c e b d f	g h	□i	k	
	Degree Requirer	nents O Core Co	urse (O Free Elective O Tech Elective		Degree Require	ments () Coi	gree Requirement re Course		ee Electi ech Electi		Other .
	Prereq	AOSS 479 or CH	IEM 365			Prereq		E 479	9 OR CHEM 365				
Х	EnforceAdvised					EnforceAdvised							
	Credit					Credit	None						
	Restrictions					Restrictions	Level of	Crodi					
	☐ Undergrad	Level of Credit	Non-Rokhm Grad		Contact Hrs/Wk	□ Undergrag	i only	Ugra	ad or Non-Rokhm Grad	Credi	t Hours	Contac Hrs/W	
	Rackham	Grad ☐ All Credit t m Grad ☐ Rckhm Gr	Non-Rckhm Grad types ad w/add'l Work	Min Max	Number	Undergrad Rackham Non-Rckh	m Grad	All C Rckh	redit types hm Grad w/add'l Work	Min 3		Numbe	er
	☐ Non-Rckhi	Rokhm Grad			of Wks	Ugrad or I	Rckhm Grad					of Wks	-
_	Repeatab	oility (Indi Research,	Dir. Study, Dis	sertation: Is thi	s course repeata	ble? 🗑 N		?	Max Times?		it be repo e same t		O Yes
C.	Class T	vpe(s)	Gr	ading Loca	tion	Cogniz	ant Facul				Title		
	∠ Lec	Sem Dis			nn Arbor								
	Rec				iological Station amp Davis								
	Graded		一		xtension								
	Lec Rec		Other	Course Is Y Gra	ded 🗆		ourse: Atta a regular gi		omination if Cogniz	ant Fa	culty		
		val Info	Approved by		Approved Date			mitted		ept.	Cross-	listed D	Dept.
		riculum Comm.							*				
					1	_			ent Chair Nam	е	Chair S	ignatu	ure
	Fac				1	Home D			and Space				
		ss listed Unit 1			-	Cross-			NI .				
		oo noted Offit Z				De	ot(s)ENS	シベド	N		ļ		

2703

		2700	
SUPPORTING STATEMENT			'
Updated CARF in support of new department name change and new cur	riculum.		
		•••••	
re any special resources or facilities required for this course?	☐ Yes ☐ No		
Detail the Special requirements			

	THE UNIVER	RSITY OF MICHIGAN 0		ENGINEER	ING	Form Number	2685	
	College Curric	Course Appro- culum Committee, 1420 L		a Center B	uildina	Form Number		_
	Action Requested			g Octilet D	ulluling	Date	10/14/2015	
	O New Course	Complete the followi	-			Effective Term	Winter 2016	
		New Courses - B & C Modifications - A modi		n B&C	completely	Ellective Term		
		Deletions - A & C com)II, D a O	completely	Course Offer Freq	☑ Indefinitely	
	A. CURRENT LISTING			B. REC	UESTED L		One term o	nly
	Home Department	Cor	urse Number	Home Dep			Cours	se Number
	·					0 Mata		
_	AOSS Atmos, Oceanic & Space	e Sci	591			& Meteorology	59	1
	Cross Listed Course Information			Cross List	ed Course Inf	formation		
	Course Title			Course T	41-			
	Course Title							
	Time Sched				racticum I	+		
	TITLE Max = 19 Spaces			TITLE ABBRE-	Time Sched Max = 19 Space	Climate Practicum	I	
	VIATION Transcript Max = 20 Spaces			VIATION	Transcript Max = 20 Space	Climate Practicum	I	
一 [']	Course Description			Course De	scription for 0	Official Publication (Max	= 50 words)	
_	Introduction to individual and team			Introducti	on to individ	dual and team resear	ch on real-world	l
	in the area of applied climate. A m					of applied climate. A		
	government laboratory will pose th					nment laboratory will		
	research. Students will learn how t already acquired. This course follo		ey nave			earch. Students will le already acquired. T		
	aneddy doddined. This course folio	wed by 71000 002.		CLIMATE		alleady acquired. I	iis course iollov	veu by
				02	. 002.			
	PROGRAM a c	e □g □i □k		PROG	RAM	o a □c ⊠e ⊠	g ⊠i □k	
	OUTCOMES: b d			OUTCO	MES:	ob ⊠d □f ⊠	h 🛛 j	
		nent O Free Elective	O Other	Degree		Degree Requirement C		O Other
	Requirements O Core Course	O Tech Elective		Require			Tech Elective	
	Prereq			Prereq		raduate standing		
	O Enforced O Advised			EnforcedAdvised	i			
	Credit			Credit				
	Restrictions			Restrictions				
	Level of Credit		ntact		Level of Cre		redit Hours Hrs/	
\neg	☐ Undergrad only ☐ Ugrad or Non-Rckhm ☐ All Credit types ☐ Rckhm Grad w/add'l V		s/Wk	Undergrad Rackham	only U		Min Max Num	
	□ Non-Rckhm Grad □ Rckhm Grad w/add'l V □ Ugrad or Rckhm Grad	of	Wks	Ugrad or F	ckhm Grad	ckriiri Grad Wadd i Work	4 4 of W	ks 14
	Repeatability (Indi Research, Dir. Stud	dy, Dissertation: Is this	course repeatal	ole? O Ye	IVIdX		Can it be repeated	
C.					Hours:		n the same term?	○ No
_	Class Type(s) X Lec Sem Dis Other	Grading Location		Cogniz	ant Faculty	wember:	Title	
	Rec X Lab Ind		n Arbor logical Station					
	Graded Section	P/F Car	mp Davis					
	X Lec Sem Dis Other	S/U Ext	ension	Grad C	oureo: Attach	nomination if Cognizan	t Faculty	
	Rec Lab Ind	Course Is Y Grade	ed 🗆		regular grad	uate faculty		
	Approval Info Approv	ved by Name	Approved Date		Submitt	ed By: Home Dep	. Cross-listed	Dept.
	Curriculum Comm.				Donast	mont Chair Nama	Chair Siana	turo
				٦		ment Chair Name	Chair Signa	iture
	Faculty			Home De	ept. Climate	e & Space		
	☐ Cross listed Unit 1 ☐ Cross listed Unit 2			Cross-li				
	- Cross listed Offit 2			Dep	ot(s)			

SI.	IPPO	RTING	STA	TEME	NT

Updated CARE in support of new department name and new curriculum.
Are any special resources or facilities required for this course?
Detail the Special requirements
(1)Projects.will.be.established.well.in.advance.through.industry.contacts.to.ensure.the.right.number.of.interesting
(2)

	THE UNIVERSITY OF MICHIGAN COLLEGE OF	ENGINEERING 2686
	Course Approval Request College Curriculum Committee, 1420 Lurie Engineeri	ing Center Building
	Action Requested	Date 10/14/2015
	New Course New Course New Course See Complete the following sections New Courses - B & C completely	: Effective Term Winter 2016
	Modification of Existing Course Deletion of Course Modifications - A modified informat	Elicotive Term
	Deletions - A & C completely	Course Offer Freq Indefinitely
	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
	TITLE Time Sched	T 0.1
	ABBRE- Max = 19 Spaces	ABBRE- Max = 19 Spaces Climat Practicum II
	Max = 20 Spaces	VIATION Transcript Climate Practicum II
Χ	Course Description	Course Description for Official Publication (Max = 50 words)
	Introduction to individual and team research on real-world problems	Introduction to individual and team research on real-world
	in the area of applied climate. On a research project started in AOSS 591 and guided by a mentor from a commercial or	problems in the area of applied climate. On a research project started in CLIMATE 591 and guided by a mentor from a
	government laboratory, students will apply the principles of risk	commercial or government laboratory, students will apply the
	analysis and objective assessment of adaptive strategies.	principles of risk analysis and objective assessment of adaptive
		strategies.
	PROGRAM OUTCOMES: b d f h j	PROGRAM
	Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective O Tech Elec	Degree ● Degree Requirement ○ Free Elective ○ Other Requirements O Core Course ○ Tech Elective
	Prereq Senior or Graduate Standing and AOSS 591	Prereq Senior or Graduate Standing and CLIMATE 591
	O Enforced O Advised	O Enforced Advised
	Credit Restrictions	Credit Restrictions
	Level of Credit Contact	Level of Credit Contact
	Undergrad only Ulgrad or Non-Rokhm Grad Credit Hours Hrs/Wk	Undergrad only Ulgrad or Non-Rokhm Grad Credit Hours Hrs/Wk 6
	Rackham Grad All Credit types Min Max Number of Wks	Rackham Grad Non-Rickham Grad Non-Rickham Grad Ugrad or Rickham Grad Wadd1 Work Rickham Grad Wadd1 Work Ugrad or Rickham Grad Number William William
		Vas O O
_	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata	Hours? Times? In the same term? No
C.	Class Type(s) Grading Location	Cognizant Faculty Member: Title
	□ Lec □ Sem □ Dis □ Other	
	Rec Lab Ind CR/NC Biological Station	
	Graded Section P/F Camp Davis S/U Extension	
	X Lec Sem Dis Other	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty
	Approval Info Approved by Name Approved Date	<u> </u>
	Curriculum Comm.	
		Department Chair Name Chair Signature
	Faculty	Home Dept. Climate & Space
	☐ Cross listed Unit 1 ☐ Cross listed Unit 2	Cross-listed
	- Cross listed Offic 2	Dept(s)

Form Number	
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2686

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

Are any special resources or facilities required for this course?		
Detail the Special requirements		
(1)Projects, will be established well in advance through industry contacts to ensure the right num	ber.of.interesti	ng

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.),.........

X			oval Request Lurie Engineerin ing sections: completely lified informatio	g Center Bu on, B & C c B. REQU Home Depa CLIMATE Cross Lister	ompletely JESTED L rtment Climate Course Inf	& Meteorology	608	e Number
X	Course Title Current Topics in Atmospheric, TITLE Time Sched Max = 19 Spaces	Oceanic and Space Sc	iences	TITLE	pics in Clir Time Sched Max = 19 Space	nate and Space Scie	nces and Engine	ering
X	Aberta- ViATION Transcript Max = 20 Spaces Course Description Advances in specific fields of at revealed by recent research. Le reading.			Course Des Advances	in specific	g Current Topics Official Publication (Max fields of climate and ssearch. Lecture, dis	space sciences,	
	Degree O Degree Requir	e g i k f h j	O Other	PROGF OUTCOI	MES:	egree Requirement C		Other
	Requirements O Core Course Prereq Permission of instructo O Enforced O Advised	O Tech Elective		Requirem Prereq D Enforced D Advised	ents OC	Core Course (Tech Elective	
	Credit Restrictions Level of Credit Undergrad only Ugrad or Non-Rck Rackham Grad Rackham Grad Rockham Grad Ugrad or Kortham Grad Ugrad or Rockham Grad Ugrad or Rockham Grad Non-Rockham Grad Wadd	khm Grad Credit Hours Hi	ontact rs/Wk	Credit Restrictions L Undergrad o Rackham Gi Non-Rckhm Ugrad or Rci	ad ∐ Al Grad □ R	grad or Non-Rokhm Grad	redit Hours Min Max 1 4 Numb	Nk 1-4 per
c.	Repeatability (Indi Research, Dir. S Class Type(s) X Lec Sem Dis Oth Rec Lab Ind Graded Section X Lec Sem Dis Oth Rec Lab Ind Approval Info App Curriculum Comm.	Study, Dissertation: Is this	ion In Arbor pological Station amp Davis tension	Cogniza AOSS Far Grad Cor is not a r	nt Faculty culty urse: Attach egular grad Submitt Depart	Member: nomination if Cognizan uate faculty ed By: Member Dep	Can it be repeated n the same term?	Yes No Dept.
	☐ Faculty ☐ Cross listed Unit 1 ☐ Cross listed Unit 2			Home Dep Cross-lis Dept	ted	& Space		

SUPPORTING STATEMENT Updated CARE in support of new department name and new curriculum.	
	•••••
	•••••
	•••••
	•••••
Type VIII	
re any special resources or facilities required for this course? ☐ Yes ☒ No	
Detail the Special requirements	

	THE UNIVERSITY	OF MICHIGAN COLLEGE O Course Approval Request	F ENGINEERING Form Number	2704
		Committee, 1420 Lurie Enginee	ring Center Building Date	10/20/2015
	Action Requested Comp	lete the following sections		10/20/2010
		Courses - B & C completely	Effective Terr	n Winter 2016
	O Deletion of Course Modifi	cations - A modified informa		a ☑ Indefinitely
		ons - A & C completely	Course Offer Fre	q ☐ One term only
	A. CURRENT LISTING		B. REQUESTED LISTING	
	Home Department	Course Number	Home Department	Course Number
	AOSS Atmos, Oceanic & Space Sci	606	CLIMATE Climate & Meteorology	606
Χ	Cross Listed Course Information		Cross Listed Course Information	
			SPACE Space Science & Engineeri	ng 606
			1	
П	Course Title		Course Title	
ш	Time Sched		Computer Applications to Geo-Fluid Pro	blems
	TITLE Max = 19 Spaces		TITLE Time Sched Max = 19 Spaces Comp Appl Geo	Fluid
	VIATION Transcript Max = 20 Spaces		VIATION Transcript Max = 20 Spaces	
\Box	Course Description		Course Description for Official Publication (N	lax = 50 words)
ш			Solution of geo-fluid problems by nu	imerical techniques
			using a digital computer. Lectures,	aboratory, exercises
			using the digital computer.	
			1	
			1	
			1	
			1	
	PROGRAM a c e C D b d f]g □i □k]h □j	PROGRAM a c e COUTCOMES: b d f	∏g ∏i ∏k ∏h ∏j
	Degree O Degree Requirement O Core Course	O Free Elective O Other O Tech Elective	Degree O Degree Requirement O Core Course	O Free Elective O Other O Tech Elective
	Prereq AOSS 442, AOSS 451, ENGR 1	02 and MATH 450	Prereq CLIMATE 442, CLIMATE 451, E	NGR 103, MATH 450
Х	O Enforced Advised		O Enforced Advised	
			Credit	
	Credit Restrictions		Restrictions	
	Level of Credit	Credit Hours Hrs/Wk	Level of Credit	Credit Hours Contact Hrs/Wk 3
\Box	Undergrad only Ugrad or Non-Rckhm Grad All Credit types Rockham Grad Rockhm Grad Rockhm Grad Rockhm Grad	Min Max Number	Undergrad only Rackham Grad Non-Rckhm Grad Rockham Grad Rockhm Grad Rockhm Grad Wadd'l Work	Min Max Number
ш	□ Non-Rckhm Grad □ Rckhm Grad w/add'l Work □ Ugrad or Rckhm Grad	of Wks	☐ Ugrad or Rckhm Grad	3-4 3-4 of Wks 14
C.	Repeatability (Indi Research, Dir. Study, Dis	sertation: Is this course repea	Hours? Times?	Can it be repeated Yes in the same term? No
_		rading Location	Cognizant Faculty Member:	Title
Ш		A-E Ann Arbor CR/NC Biological Station		
	Graded Section	P/F Camp Davis	"	
	Lec Sem Dis Other	S/U Extension	Grad Course: Attach nomination if Cogniz	ant Faculty
		Course Is Y Graded	is not a regular graduate faculty	
	Approval Info Approved by	y Name Approved Da	te Submitted By: Home D	ept. Cross-listed Dept.
	Curriculum Comm.		Department Chair Name	Chair Signature
			_	- Pilali Signature
	☐ Faculty ☐ Cross listed Unit 1			
	Cross listed Unit 1		Cross-listed Dept(s).	+

2704

JPPORTING STATEMENT		•
lpdated CARF in support of new department name change and new c	urriculum.	
e any special resources or facilities required for this course?	☐ Yes ☐ No	
etail the Special requirements		

	Action Requested	College Curriculum	Course A Committee, 1	AN COLLEGE Of approval Request 420 Lurie Engineer	ring Center E		Form Numbe		
	New Course Modification of Exis Deletion of Course	ting Course New Mod	Courses - B	& C completely modified informa			Effective Ter		
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	Home Department			Course Number	Home Dep		011110		Course Number
	AOSS Atmos, Oce	anic & Space S	ci	651	100000000000000000000000000000000000000		& Meteorology		651
٦	Cross Listed Course Int					ed Course Info			
_					SPACE	Space Scie	nce & Engineer	ring	651
	Course Title				Course Ti		Atmospheres a	nd the Uppe	r Atmosphere
	TITLE Time Sched Max = 19 Space	es			TITLE	Time Sched	Dyn Planet Atm		
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7	Course Description	05				Max = 20 Spaces	fficial Publication (M		ds)
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Ī	Repeatability (Indi Rese	arch, Dir. Study, Dis	sertation: Is t	his course repeata	@ NO	Hours?	Max — Times? ——	Can it be re in the same	
ן	Rec Lab Ir	ois Other X	A-E X CR/NC P/F	Ann Arbor Biological Station Camp Davis Extension		nt Faculty Me		Title	
	Rec Lab I	nd	Course Is Y Gr		is not a n	egular gradual			listed Dani
	Approval Info Curriculum Com	Approved by m.	reame	Approved Date	-		By: Home De		Signature
	Faculty Cross listed Unit				Home Dep	t. Climate &		MA	dun
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				_	n Number	
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PPORTING STATE						
dated CARE in suppor	t.of.new.department.na	ame.change.and.new				

any special resource	s or facilities required		Yes No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			
any special resource	nents		☐ Yes ☐ No			

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING 2689 Course Approval Request Form Number College Curriculum Committee, 1420 Lurie Engineering Center Building 10/14/2015 Date Action Requested Complete the following sections: O New Course Effective Term Winter 2016 New Courses - B & C completely Modification of Existing Course Modifications - A modified information, B & C completely O Deletion of Course Course Offer Freq ☐ Indefinitely ☐ One term only Deletions - A & C completely A. CURRENT LISTING B. REQUESTED LISTING Home Department Course Number Course Number Home Department AOSS Atmos, Oceanic & Space Sci CLIMATE Climate & Meteorology Cross Listed Course Information Cross Listed Course Information 747 SPACE Space Science & Engineering Course Title Course Title AOSS Student Seminar CLaSP Student Seminar Time Sched TITLE TITLE Max = 19 Spac VIATION Course Description for Official Publication (Max = 50 words) Course Description Students take turns presenting short research seminars (20 Students take turns presenting short research seminars (20 minutes) and/or short talks introducing upcoming speakers in AOSS minutes) and/or short talks introducing upcoming speakers in 749. Some class time will also be devoted to discussions of CLIMATE/SPACE 749. Some class time will also be devoted to effective oral and poster presentations and professional ethics. discussions of effective oral and poster presentations and professional ethics. □a □c □e □g □i □k а с **OUTCOMES: OUTCOMES:** O Degree Requirement O Free Elective O Other O Degree Requirement O Free Elective O Other Degree Degree Requirements O Core Course O Tech Elective Requirements O Core Course O Tech Elective Prereq Prereq O Enforced O Enforced O Advised Advised Level of Credit Level of Credit Credit Hours Hrs/Wk Undergrad only Rackham Grad Non-Rckhm Grad Ugrad or Rckhm Grad Hrs/Wk Min Max Number Number Ugrad or Rokhm Grad Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? \(\bigcup \text{No Hours} \) \(\text{Hours} \) Can it be repeated Max Times? in the same term? O No Cognizant Faculty Member: Title Class Type(s) Location Lec Sem Dis Other __ A-E Ann Arbor Rec Lab Ind CR/NC Biological Station P/F Camp Davis Graded Section S/U Extension __ Lec __ Sem __ Dis __ Other __ __ Rec __ Lab __ Ind Grad Course: Attach nomination if Cognizant Faculty Course Is Y Graded is not a regular graduate faculty Submitted By: Home Dept. Cross-listed Dept. Approved by Name Approved Date Approval Info ☐ Curriculum Comm. Department Chair Name Chair Signature Home Dept. Climate & Space ☐ Faculty Cross listed Unit 1 Cross-listed Cross listed Unit 2 Dept(s).

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UPPORTING STATEMENT Jpdated CARE in support of new department name change and new curriculum		•
Jpdated CARE in support of new department name change and new curriculum		
	 •••••	
e any special resources or facilities required for this course?		
etail the Special requirements		

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING 2690 **Course Approval Request** Form Number College Curriculum Committee, 1420 Lurie Engineering Center Building 10/14/2015 Date Action Requested Complete the following sections: O New Course Effective Term Winter 2016 New Courses - B & C completely Modification of Existing Course Modifications - A modified information, B & C completely O Deletion of Course Course Offer Freq | Indefinitely Deletions - A & C completely One term only A. CURRENT LISTING B. REQUESTED LISTING Home Department Course Number Course Number Home Department CLIMATE Climate & Meteorology X Cross Listed Course Information Cross Listed Course Information 749 SPACE Space Science & Engineering Course Title Course Title AOSS Seminar ClaSP Seminar TITLE TITLE VIATION Course Description for Official Publication (Max = 50 words) Course Description Presentations from UM researchers and outside speakers about Presentations from UM researchers and outside speakers about current research results, covering a broad range of topics in current research results, covering a broad range of topics in atmospheric and space science. In this class students take turns climate, atmosphere and space science. In this class students serving as seminar chair. Questions from students will be handled take turns serving as seminar chair. Questions from students will before those from faculty. Conditions for credit are participation in be handled before those from faculty. Conditions for credit are this seminar and the completion of a short paper in which each participation in this seminar, and the completion of a short paper in student follows up on one talk given as part of this seminar series. which each student follows up on one talk given as part of this seminar series. _a _c _e _g _i _k **OUTCOMES: OUTCOMES:** Degree Requirement O Free Elective O Other Degree Requirement O Free Elective O Other Degree Degree Requirements O Core Course O Tech Elective Requirements O Core Course O Tech Elective Prereq Prereq O Enforced O Enforced O Advised Advised Level of Credit Level of Credit Contact Hrs/Wk 1 Credit Hours Hrs/Wk Undergrad only Rackham Grad Non-Rckhm Grad Ugrad or Rckhm Grad Min Max Min Max Number Number of Wks Ugrad or Rckhm Grad of Wks Yes Max Max Can it be repeated Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? No Hours? 6 Times? 6 in the same term? No Cognizant Faculty Member: Title Class Type(s) Location Ann Arbor Rec Lab Ind CR/NC Biological Station P/F Camp Davis Graded Section X S/U Extension X Lec ☐ Sem ☐ Dis ☐ Other _ Grad Course: Attach nomination if Cognizant Faculty Ind Course Is Y Graded \square Rec Lab is not a regular graduate faculty Submitted By: Home Dept. Cross-listed Dept. Approved by Name Approved Date Approval Info ☐ Curriculum Comm. Department Chair Name Chair Signature Home Dept. Climate & Space ☐ Faculty Cross listed Unit 1 Cross-listed Cross listed Unit 2 Dept(s).

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2090

JPPORTING STATEMENT		
pdated CARF in support of new department name change and new of	urriculum.	
e any special resources or facilities required for this course?	Yes No	
etail the Special requirements		
etali trie opecial requirements		

		THE	UNIVERSITY	OF MICHIGAN Course Appro		ENGINEER	ING	Form Number	r [2633	
	Action D	Collect equested	je Curriculum (Committee, 1420 I	Lurie Engineerii	ng Center B	uilding	Date	e 8/5	5/2015	
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			Deletio	ons - A & C cor	npletely			Course Offer Fr		Indefinit One ter	
	A. CUF	RENT LISTING				B. REC	UESTED L	ISTING			
	Home De	epartment		Co	urse Number	Home Dep	artment			С	Course Numbe
	AOSS A	tmos, Oceanic a	& Space Sci		101	SPACE	Space Sc	ience & Enginee	ring		101
Χ	Cross List	ed Course Informati	on			Cross List	ed Course In	formation			
	ASTRO	Astronomy			103	ASTRO	Astronom	у			183
$\overline{}$	Course Ti	tle				Course T	itle				
Ш						Rocket S	cience	1			
	TITLE ABBRE-	Time Sched Max = 19 Spaces				TITLE ABBRE-	Time Sched Max = 19 Space	es			
	VIATION	Transcript Max = 20 Spaces				VIATION	Transcript Max = 20 Spac	es			
Ш.	Course D	escription				Course De	scription for	Official Publication (Max = 5	0 words)	
						Topics co space er human p	overed inclu vironment,	e science of space idde history of spac satellites, remote : space. The mather metry.	eflight, sensin	rockets, g, and th	, orbits, the ne future
	PROG	MES: b			0.00	OUTCO	MES:	a c e	□ g ⊠ h		
	Degree Requirer			O Free Elective O Tech Elective	O Other	Degree Require		Degree Requirement Core Course		ech Electiv	
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Щ	O Advised					O Advised	-				
П	Credit Restrictions					Credit Restrictions					
	Undergrad	Level of Credit d only Ugrad or N Grad All Credit n m Grad Rokhm Gr	lon-Rckhm Grad ypes ad w/add'l Work	Credit Hours Hi	ontact rs/Wk lumber f Wks	Undergrad Rackham Non-Rckh	Level of Croonly Make I Grad	edit Jgrad or Non-Rckhm Grad Nil Credit types Rckhm Grad w/add'l Work	Credi Min 3	Max	Contact Hrs/Wk 3 Number of Wks 14
C.	Repeatab	oility (Indi Research,	Dir. Study, Dis	sertation: Is this	course repeata	ible? O Y	Max Hours?	Max Times?		it be repe e same te	
<u>.</u>	Class T		_	rading Locati	ion		ant Faculty	Member:		Title	
		Sem Dis Lab Ind			n Arbor ological Station	Aaron R	dley		_	Professo	or
		Section		P/F Ca	mp Davis						
	Lec Lec	Sem Dis	_ Other	_	tension	Grad C	ourse: Attach	nomination if Cogni	zant Fa	culty	
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		val Info rriculum Comm.	Approved by	rivallie	Approved Date	-	Subifili	accordy. Zariomet	- opt. L	_ 0.000-1	Бори
						_		tment Chair Nam	ne	Chair Si	ignature
	☐ Fac					Home D		P Mark Moldwin			
		oss listed Unit 1				Cross-I	sted Astron	omy			
		oo nawu Unii Z			I	De _l	ot(s)			 	

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SUPPORTING STATEMENT		
Updated CARF in support of new department name change and new c	urriculum.	
Are any special resources or facilities required for this course?	Yes No	
Detail the Special requirements		
South the openior requirements		

х	THE UNIVERSITY OF MICHIGAN COLLEGE O Course Approval Request College Curriculum Committee, 1420 Lurie Enginee Action Requested New Course Modification of Existing Course Deletion of Course Complete the following sections New Courses - B & C completely Modifications - A modified informa Deletions - A & C completely A. CURRENT LISTING Home Department Course Number AOSS Atmos, Oceanic & Space Sci 103 Cross Listed Course Information	Form Number 2/30 Date 12/21/2015 S: Effective Term Winter 2017
	Course Title TITLE ABBRE- VALTION Max * 19 Spaces Max * 20 Spaces Course Description	Course Title Intro Space Weather TITLE ABBRE: The Schod Name: 19 Space Weather Mass: 19 Space Weather Tamacing Max: 19 Space Weather Tamacing Max: 20 Spaces Intro Space Weather Course Description for Official Publication (Max = 50 words) "Space weather" is an emerging discipline of space science that studies the conditions in space that impact society and Earth's technological systems. Space weather is a consequence of the behavior of the sun, the nature of Earth's magnetic field and atmosphere, and our location in the solar system.
7	PROGRAM OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Other Requirements O Core Course O Tech Elective Prereq O Enforce O Advised Credit Resinctions Level of Credit Upday or Non-Richm Grad Mon-Richm Gr	PROGRAM OUTCOMES: b d f k M J Degree O Degree Requirement ® Free Elective O Other Requirements O Core Course O Tech Elective Prereq O Enforced O Enforced
с.	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata Class Type(s) Lec Sem Dis Other A-E Biological Station Graded Section Rec Lab Ind Course Is Y Graded Approval Info Ourriculum Comm. Approval Info Ourriculum Comm. Approval Info Ourriculum Comm. Faculty Cross listed Unit 1 Cross listed Unit 2	ble? Yes Max Max 1 Can it be repeated Yes in the same term? No Cognizant Faculty Member: Title Mark Moldwin Professor Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

SUPPORTING STATE	

103 Introduction to Space Weather is a general overview of the Earth 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 Co	E 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		- COLLEGE OF oval Request	ENGINEER	RING	Form Numbe	, Г	2695	٦	
			ge Curriculum C		Lurie Engineerii	ng Center E	uilding	Date	=	/20/2015		
		equested	Comp	lete the follow	ving sections:			Dati	10	72072013		
	New C Modifice	ourse cation of Existing Co	urse New C	ourses - B & 0	Completely			Effective Ter	m W	inter 201	6	
		on of Course	Modifie		dified informati	on, B & C	complete		▽	Indefinite	alv	
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		RENT LISTING						D LISTING				
		epartment		C	ourse Number	Home Dep				Co	ourse Nu	Jmber
		tmos, Oceanic 8			204			Science & Enginee	ring		204	
Χ		ed Course Informati	on					e Information				
		Astronomy			204	ASTRO		•			204	
	GEOSC	Geological Scient	ences		204	EARTH	Earth a	nd Envir Sci			204	
	Course Ti	tle				Course T	itle					
						The Plan	ets: The	eir Geology and Clima	ates			
	TITLE	Time Sched				TITLE	Time Sc	hed s				
	ABBRE- VIATION	Max = 19 Spaces Transcript				ABBRE- VIATION	Max = 19 S	pt Discrete Cool/				
	Course De	Max = 20 Spaces					Max = 20 S	pt Spaces Planets: Geol/O for Official Publication (50 words)		
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								mospheres of the p				
								pecial emphasis gi				
						aspects	of geolo	ogy and climatolog	y. Inte	nded for	non-	
								with a background	in hig	h school	math a	and
						science						
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•		oility (Indi Research,	Dir. Study, Dis			ible? • N			Can	it be repea	ated 🔘	Yes No
C.	Class T	ype(s)	Gr	ading Loca	tion	Cogniz		ulty Member:		Title		
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	Rec				iological Station amp Davis							
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UPPORTING STATEMENT	'		
Ipdated CARF in support of new department name change and new curric	culum.		
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e any special resources or facilities required for this course?	Yes No		
etail the Special requirements			
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	THE UNIVERSITY OF MICHIGAN COLLEGE O Course Approval Request College Curriculum Committee, 1420 Lurie Enginee Action Requested New Course Modification of Existing Course Deletion of Course Deletion of Course Current Listing A. CURRENT LISTING Home Department Course Number AOSS Atmos, Oceanic & Space Sci 477 Cross Listed Course Information	Form Number Date S: Effective Term Date Winter 2016
	Course Title	Course Title Space Weather Modeling
7	TITLE	TITLE ABBRE. VARTON VARTON Amax = 20 Spaces VARTON An introduction to a variety of models of the space environment.
	PROGRAM a c e g i k OUTCOMES: b d f h j Degree O Degree Requirement O Free Elective O Other	PROGRAM
	Requirements O Core Course O Tech Elective Prereq AOSS 370 O Enforced	Requirements O Core Course O Tech Elective Prereq SPACE 370; C or better © Enforced
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	Credit Restrictions	Credit Restrictions
	Level of Credit Undergrad only Rackham Grad Rackham Grad Rockham Grad	Level of Credit Undergrad only Rackham Grad Non-Rokhm Grad Non-Rok
	Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeata Class Type(s) Grading Location	bble?
ב	Class Type(s) Grading Location	Aaron J. Ridley Associate Professor
	Rec Lab Ind Course Is Y Graded	is not a regular graduate faculty
	Approval Info Approved by Name Approved Date Curriculum Comm.	Submitted By: More Dept. Cross-listed Dept. Department Chair Name Chair Signature Home Dept. Climate & Space
	Cross listed Unit 1 Cross listed Unit 2	- Cross-listed
	Li Cross listed Unit 2	Dept(s)

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PPORTING STATE		nt.name.and.new.curric	ılum.		

		uired for this course?	☐ Yes ⊠ No		**********
any special resourc		uired for this course?	☐ Yes ⊠ No		
tail the Special require		uired for this course?			
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		ulty ss listed Unit 1 ss listed Unit 2				Cross-I	ept. Clim isted ENS	ate & S	pace				

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2680	

SUPPORTING STATEMENT		
Updated CARF in support of new department name and ne	ew curriculum.	
are any special resources or facilities required for this course?	Yes X No	
Detail the Special requirements		

	Action Requested New Course Modification of Existing C Deletion of Course A. CURRENT LISTING Home Department		Complete the following sections New Course - B & C completely New Courses - B & C completely Modifications - A modified informat Deletions - A & C completely CURRENT LISTING The Department Course Number SS Atmos, Oceanic & Space Sci 499			B. REQUESTED LISTING Date 11/30/2015 Winter 2016 Winter 2016 Windefinitely Course Offer Freq One term only				
	Course T	itle				Course Titl				
_	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces				VIATION I	Time Sched Max = 19 Space Transcript Max = 20 Space	Directed Study		
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		THE	UNIVERSITY	OF MICHIGAN Course Appro		ENGINEE	RING		Form Number	27	726	
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Form Number

2726

SUPPORTING STATEMENT

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
Are any special resources or facilities required for this course?
Detail the Special requirements

		Y OF MICHIGAN - COLLEGE OF Course Approval Request of Committee, 1420 Lurie Engineer		Form Numbe	
	Modification of Existing Course Deletion of Course	nplete the following sections Courses - B & C completely ifications - A modified informat tions - A & C completely		Course Offer Fro	Winter 2016
	Home Department	Course Number	Home Department		Course Numbe
	AEROSP Aerospace Engineering		C. C		
_	Cross Listed Course Information	583		space Engineering	583
х	AOSS Atmos, Oceanic & Space So	ci 583	Cross Listed Cour SPACE Space	se information Science & Engineer	ing 583
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_	Time Sched			Space Systems Design	
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