Program Change Request

Date Submitted: 02/08/24 11:38 am

Viewing: **SC-MS-CLIS : Climate Science, MS**

Last approved: 04/04/23 8:24 pm

Last edit: 03/01/24 9:43 am

Changes proposed by: jbazaz

**Catalog Pages
Using this Program**
[Climate Science, MS](#)

No Longer
Anticipated closure
Rationale for

Are you completing this form on someone else's behalf?

Yes

Requestor:

In Workflow

1. **AOES CC**
2. **AOES Chair**
3. **SC Curriculum Committee**
4. SC Assistant Dean
5. Assoc Provost-Graduate
6. Registrar-Programs

Approval Path

1. 02/08/24 11:52 am Barry Klinger (bklinger): Approved for AOES CC
2. 02/12/24 2:02 pm Mark Uhen (muhen): Approved for AOES Chair

History

1. Dec 10, 2018 by Jennifer Bazaz Gettys (jbazaz)
2. Dec 10, 2018 by Tory Sarro (vsarro)
3. Mar 15, 2019 by Tory Sarro (vsarro)
4. Sep 9, 2019 by Tory Sarro (vsarro)
5. Jan 30, 2020 by Jennifer Bazaz Gettys (jbazaz)
6. Feb 23, 2021 by jriemen

7. Feb 8, 2022 by
   Jennifer Bazaz
   Gettys (jbazaz)
8. Apr 4, 2023 by
   Jennifer Bazaz
   Gettys (jbazaz)

Name	Extension	Email
Barry Klinger	5302	bklinger

Effective Catalog: 2024-2025

Program Level: Graduate

Program Type: Master's

Degree Type: Master of Science

Title: Climate Science, MS

1. What was the process used with
2. What evidence was used to ident
3. Have you ensured there are no oth
   b. Has CPE confirmed the proposed ba
   c. Has the instructor(s) for this badge
   d.
   f. Does this badge provide a benefit for c
5. Is this badge co-sponsored with anothe

   a. What is the organization, program, or d
   Earning Criteria

Course:
Badge:
Participant:
Payment:
Portfolio:
Presentation:
Assessment:
Credential:
Education
Other:
Project:
Professional
Schedule/Registration:
Volunteer:
   Skills Tag
Skills Tag
   Badge Attributes
Please select one from each category:
Achievement Type:
Mastery Level:
Time Commitment:
Cost:
Industry Standards:
Recommendations:
   Issuance information and Pricing
Pricing: See https://cpe.gmu.edu/digitalbadgepricing/ for more information
Estimated Number of Badges Expected to be Issued:
Notes:

Additional considerations will be given to CLIS from other internal review bodies

• A Mason Digital Credentials Advisory Group may be developed to

Banner Title: MS Climate Science

Is this a retitling of an existing

Existing Program

Registrar/OAPI Use Only – SCHEV Status   Approved

Registrar's Office Use Only – Program Start Term   Spring 2020

Registrar/OAPI Use Only – SCHEV Letter   Climate Science MS.pdf

Registrar/OAPI Use Only – SACSCOC Status

Concentration(s):

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Climate Modeling	CM
2	Climate Data	CD

INTO Major(s):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Atmospheric, Oceanic, & Earth Sciences

Jointly Owned Program?   No

Participating

Participating

Justification

What: Add CLIM 751 Predictability and Prediction of Weather and Climate to list of "Mathematical, Computational, or Geographical" electives.

Why: The course fits in this category because students in the course are taught mathematical techniques related to climate data and do computational term projects on climate data. It is also helpful because PhD students take CLIM 751 and this helps them fulfill a requirement of the Climate Science MS. Some PhD students end up getting the Climate MS in addition to, or instead of, the PhD. The relevant requirement is for the Climate Data concentration, which includes requirement to take 2 electives from this "Mathematical…" category. We have already submitted sub/waiver forms so that students can use CLIM 751 for this requirement.

What: Referring applicants to central admissions language and removing extraneous wording.
Why: To make the program more adaptable to changes in university policies.

Catalog Published Information

Total Credits Required: Total Credits: 33

Registrar's Office Use Only - Program Code:

SC-MS-CLIS

Registrar/IRR Use Only – Program CIP Code

Admission Requirements:

Admissions

University-wide admissions policies can be found in the <u>Graduate Admissions Policies</u> section of this catalog. <u>International students and students having earned international degrees should also refer to Admission of International Students for additional requirements.</u>

~~To apply for this program, please complete the George Mason University Admissions Application.Admission requirementsinclude:~~

Eligibility

<u>Applicants should possess</u> ~~An earned baccalaureate degree from~~ an <u>earned baccalaureate degree with</u> ~~institution of higher education accredited by~~ a <u>minimum 3.00 GPA on a 4.00 scale from an institution of higher education accredited by a</u> Mason-recognized U.S. institutional accrediting agency or international <u>equivalent.</u> ~~equivalent, verified from official transcripts.~~
~~A minimum 3.00 GPA on a 4.00 scale in baccalaureatestudy.Complete the online application and submit all requiredmaterials.~~Program admission decisions give preference to students with an undergraduate degree in physical science, mathematics, or engineering. Students with other undergraduate degrees should consult with the program's administration regarding the suitability of their undergraduate preparation.

Application Requirements

To apply for this program, prospective students should submit ~~please complete~~ the George Mason University Admissions Application and its required supplemental documentation. ~~Application.~~ The GRE is not required for admission into this program.

Program-Specific Policies:

Policies

For policies governing all graduate programs, see AP.6 Graduate Policies.

Transferring Previous Graduate Credit into this Program

Previously earned and relevant graduate credits may be eligible for transfer into this program; details can be found in the Credit by Exam or Transfer section of this catalog.

Degree Requirements:

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Students must complete the Core Courses, Seminar/Reading, and Thesis or Non-thesis sections, and in addition, choose one concentration:

Core Courses

CLIM 511	Atmospheric Dynamics 1	3
or CLIM 711	Introduction to Atmospheric Dynamics	
CLIM 512	Physical Oceanography 1	3
or CLIM 712	Physical and Dynamical Oceanography	
CLIM 610	Introduction to the Physical Climate System	3
CLIM 614	Land-Climate Interactions	3
CLIM 690	Scientific Basis of Climate Change	3
Total Credits		15

1

Students who wish to continue with the Climate Dynamics, PhD should note that CLIM 711 Introduction to Atmospheric Dynamics and CLIM 712 Physical and Dynamical Oceanography are required for the PhD.

Seminar/Reading

CLIM 991	Climate Dynamics Seminar	1
Select 2 additional credits from the list below:		2
CLIM 796	Directed Reading and Research	
CLIM 991	Climate Dynamics Seminar	
CLIM 996	Doctoral Reading and Research	

Total Credits	3

Thesis or Non-thesis Options

Choose one of the following options:	3
Thesis Option	
CLIM 799 Master's Thesis in Climate	
Non-thesis Option	
Choose one unrestricted, graduate-level elective course 1	
Total Credits	3

1

Unrestricted, graduate-level elective courses may be chosen from the following prefixes: Climate Dynamics (CLIM), Mathematics (MATH), Computational and Data Sciences (CDS), Computational Science and Informatics (CSI), Computational Social Science (CSS), Geography and Geoinformation Science (GGS), or chosen from the Climate-Relevant elective list (below).

Other courses can be approved by the graduate coordinator.

Concentrations

Concentration in Climate Modeling (CM)

CLIM 670 Earth System Modeling	3
CLIM 715 Numerical Methods for Climate Modeling	3
CLIM 751 Predictability and Prediction of Weather and Climate	3
Choose one course from the elective lists (below)	3
Total Credits	12

Concentration in Climate Data (CD)

CLIM 680 Climate Data	3
CLIM 762 Statistical Methods in Climate Research	3
Choose two courses from the Mathematical, Computational, or Geographical elective list (below)	6
Total Credits	12

Electives

Select courses not previously taken and pay close attention to course credit values; carefully consider how the courses will work into your degree program.

Climate Science

CLIM 631	Urban Climate
CLIM 680	Climate Data
CLIM 690	Scientific Basis of Climate Change
CLIM 713	Atmosphere-Ocean Interactions
CLIM 750	Geophysical Fluid Dynamics
CLIM 751	Predictability and Prediction of Weather and Climate
CLIM 752	Ocean General Circulation

CLIM 753   General Circulation of the Atmosphere

CLIM 754   Elements of the Tropical Climate System

CLIM 759   Topics in Climate Dynamics (when the topic is "Advanced Predictability" or "Convection") 2

GEOL 532   Paleoclimatology

GEOL 535   Quantitative Stratigraphy

GEOL 565   Paleoceanography

GGS 670   Introduction to Atmosphere and Weather

Mathematical, Computational, or Geographical

CLIM 715   Numerical Methods for Climate Modeling

CLIM 751   Predictability and Prediction of Weather and Climate

CLIM 759   Topics in Climate Dynamics (when the topic is "Earth System Modeling") 2

CLIM 762   Statistical Methods in Climate Research

CLIM 763   Advanced Statistical Methods in Climate Research

GEOL 525   Modeling Earth Signals and Systems

GEOL 553   Field Mapping Techniques

CDS 501   Scientific Information and Data Visualization

CSI 501   Computational Science Programming

CSI 690   Numerical Methods

GGS 553   Geographic Information Systems

GGS 563   Advanced Geographic Information Systems

GGS 650   Introduction to GIS Algorithms and Programming

GGS 680   Earth Image Processing

GGS 692   Web-based Geographic Information Systems

PHYS 510   Computational Physics I

Climate-Relevant

GEOL 506   Soil Science

GEOL 513   Hydrogeology

GEOL 563   Coastal Morphology and Processes

BIOL 650   Environment Analysis and Modeling

CDS 502   Introduction to Scientific Data and Databases

CSI 600   Quantitative Foundations for Computational Sciences

EVPP 506   Science of the Environment I

EVPP 507   Science of the Environment II

EVPP 529   Environmental Science Communication

EVPP 542   Urban Ecosystems Processes

EVPP 543   Tropical Ecosystems

EVPP 550   Waterscape Ecology and Management

EVPP 607   Fundamentals of Ecology

EVPP 637   Human Dimensions of Climate Change (when the topic is "Climate Change Policy & Politics" or "Climate Change, Public Administration, and Management")

GGS 507   Geographic Approaches for Sustainable Development

GGS 531	Land-Use Modeling Techniques and Applications
GGS 550	Geospatial Science Fundamentals
GGS 579	Remote Sensing
GGS 656	The Hydrosphere
PHYS 660	Space Weather
AIT 580	Analytics: Big Data to Information
AIT 582	Metadata Analytics for Big Data
COMM 660	Climate Change and Sustainability Communication Campaigns
CS 504	Principles of Data Management and Mining
PUBP 710	Topics in Public Policy (when the topic is "Climate Policy & Politics" or "Climate Change, Public Administration and Management")

2

CLIM 759 Topics in Climate Dynamics is a special topics course in which different sections can address different subjects.

Retroactive Requirements Updates:

Plan of Study:

Honors Information:

Accelerated Description/Dual Degree Description:

INTO-Mason Requirements:

College Requirements & Policies:

Department / Academic Unit Requirements & Policies:

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

Courses offered via distance (if applicable):

Indicate whether students are able

What is the primary delivery format for the program?

Face-to-Face Only

Does any portion of this program occur off-campus?

No

Off-campus details:

Are you working with a vendor / other collaborators to offer your program?

No

Please explain:
**Related
Departments**

**Could this program prepare students for any type of professional licensure, in
Virginia or elsewhere?**

    No

Please explain:
Are you adding or removing a licensure component?

    No

Please explain:

Additional SCHEV & SACSCOC Information

Is the content of the new program closely related to that of an existing approved
program at the same instructional level (i.e., baccalaureate, master's, doctoral)?

Which existing approved program(s)?

Is this new program considered to be "advancing the degree level of a currently
approved program" (i.e. existing content is at lower degree level, new content is at th

Which existing approved program(s)?

Is this new program considered to be "lowering the degree level of a currently approve
program" (i.e. existing content is at higher degree level, new content is at the lower

Which existing approved program(s)?

Is this a re-opening of a program that was closed to admission within the last five years?

Date of Program Closure

What are the methods of delivery for the program?

Does this program include a course/credit-based competency-based education delivery
option?

**Is this change a simple retitling of an existing program, with no other changes, to any existing program content,
curriculum requirements, etc?**

 No

**Does this change represent a repackaging of content in an existing approved degree/certificate program at the
same instructional level (i.e., baccalaureate, master's, or doctoral)?**

 No

Which existing approved program(s)?

**Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as
content that is not currently included in an existing approved degree/certificate program at the same instructiona
level. Do not exclude gen ed credits in calculations for undergraduate programs.)**

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program?

No

What is the new method of delivery?

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

Will any additional equipment/facilities be needed?

No

Description of institutional impact:

Will any additional faculty be required?

No

Description of institutional impact:

Will any additional financial resources be needed?

No

Description of institutional impact:

Additional library/learning resources needed?

No

Description of institutional impact:

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program?   No

Green Leaf

Sustainability-focused academic programs require at least one green leaf course. Either that course is itself sustainability-focused or else the program requires a set of sustainability-related courses with aggregated

Relationship to Existing

Relationship to Existing Programs

List sustainability-focused courses currently required in the degree

Sustainability-related academic programs either require at least one sustainability-related course or else offer any green leaf course as an option or elective. *

List sustainability-related courses currently required in the degree

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Does this program cover material which crosses into another department?

                    No

Impacted Departments

Additional Attachments

SCHEV Proposal   ClimateScienceMSProposalDraft.pdf

Executive Summary

The Master of Science (MS) in Climate Science will be offered by the Department of Atmospheric, Oceanic, and Earth Sciences (AOES) to be implemented in the Fall 2019 Semester. The MS will complement the existing BS in Atmospheric Science and PhD in Climate Dynamics offered by the department. It will educate students who can conduct climate modeling experiments and diagnostic analyses at national centers; advise governments, corporations, and nongovernmental organizations on climate issues; and continue to doctoral studies in climate, atmospheric research, and related fields.

The degree requires 30 credits of course work and will have two concentrations, Climate Modeling and Climate Data. All students will take a 12 credit core of climate science classes, 6 credits of unrestricted electives, and 3 credits of seminar. Students can choose a thesis option (3 credits), or a non-thesis option in which an elective is substituted for thesis. The remaining 6 credit requirement is fulfilled in a different way by the two concentrations. Each will require a course specific to the concentration as well as an elective from a list specific to the concentration. The required courses and most electives have already been taught by AOES (including as special topics courses).

Reviewer Comments

**Additional
Comments**

Is this course required of all students in this degree program?

%wi_required.eschtml%

**Attached
Document**

Key: 720