Program Change Request

Date Submitted: 03/04/22 2:44 pm

Viewing: SC-PHD-CSI : Computational Sciences and Informatics, PhD

Last approved: 03/05/21 1:17 pm

Last edit: 03/04/22 2:44 pm

Changes proposed by: jbazaz

Catalog Pages Using this Program

Computational Sciences and Informatics, PhD

No Longer Anticipated closure date (i.e., calendar Rationale for

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

Yes

Requestor:

Name	Extension	Email
Karen Underwood	9298	kunderwo@gmu.edu

Effective Catalog: 2022-2023

Program Level: Graduate

Program Type: Doctoral

Degree Type: Doctor of Philosophy

Title: Computational Sciences and Informatics, PhD

In Workflow

1. **CDS Chair**
2. SC Curriculum Committee
3. SC Associate Dean
4. Assoc Provost-Graduate
5. Registrar-Programs

History

1. Oct 23, 2017 by clmig-jwehrheim
2. Feb 15, 2018 by rzachari
3. Mar 14, 2018 by pchampan
4. Jan 29, 2021 by Jennifer Bazaz Gettys (jbazaz)
5. Feb 23, 2021 by Johanna Riemen (jriemen)
6. Mar 3, 2021 by Johanna Riemen (jriemen)
7. Mar 5, 2021 by Johanna Riemen (jriemen)

3. What evidence was used to identify need
a. Have you ensured there are no other existi
b. Has CPE confirmed the proposed badge doe
c. Has the instructor(s) for this badge experienc
f. Does this badge provide a benefit for current or
5. Is this badge co-sponsored with another
a. What is the organization, program, or departmen

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:

- All badge requests will be routed to CPE for review and approval. Please allow 7
- A Mason Digital Credentials Advisory Group may be developed to review badge

Banner Title:	Computat Sci & Informatics PhD
Is this a retitling of an existing program?	
Existing Program	
Registrar/OAPI Use Only – SCHEV Status	Approved
Registrar's Office Use Only – Program Start Term	

Registrar/OAPI Use Only – SCHEV Letter	
Registrar/OAPI Use Only – SACSCOC Status	
Concentration(s):	
INTO Major(s):	
Registrar/IRR Use Only – Concentration CIP Code	
College/School:	College of Science
Department / Academic Unit:	Computational & Data Sciences
Jointly Owned Program?	No
Participating	
Participating	
Justification	What: Reducing letters of recommendation to two. Why: To allow us to ease the path into the program while still receiving enough information to make an informed admission decision.

Catalog Published Information

Total Credits Required:	Total: 72 credits
Registrar's Office Use Only - Program Code:	SC-PHD-CSI
Registrar/IRR Use Only – Program CIP Code	
Admission Requirements:	

Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies section of this catalog.
To apply for this program, please complete the George Mason University Admissions Application.

Eligibility

Students interested in applying for admission should have a bachelor's degree in computational science, any natural science, mathematics, engineering, or computer science with a minimum GPA of 3.00 in their last 60 credits of study. Applicants to the

PhD program should have a mathematics background up to and including differential equations and should also have knowledge of a computer programming language such as C, C++, Fortran, Python, etc.

Application Requirements

The GRE is required, unless the applicant holds a master's degree from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent. An acceptable TOEFL score (as determined by the university) is required for international students; for more information visit the Admission of International Students section of the catalog. The ETS code for Mason is 5827.

Students should submit a completed George Mason University Admissions Application along with **two** ~~three~~ letters of recommendation, an expanded goals statement, and application fee in addition to the items listed above.

Application deadlines can be found on the Office of Admissions website. Applications requesting financial support must be received by February 1 for the fall semester. Applications from local applicants may be accepted after these general deadlines.

For additional information, please contact the CSI graduate coordinator.

Program-Specific Policies:

Policies

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

Reduction of Credit

For students entering the doctoral program with a master's degree in a related field from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent, the required coursework may be reduced up to 24 credits, subject to approval of the graduate coordinator and the college's associate dean. Research-based courses and seminar courses are not eligible for reduction.

Transfer of Credit

Students who have prior graduate coursework that has not been applied to any degree may request to have a maximum of 30 of those graduate credits transferred, with approval of the graduate coordinator, the college's associate dean, and in accord with university policy. Research-based courses and seminar courses are not eligible for transfer.

Degree Requirements:

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

General Core Courses

Select two courses (6 credits) from the following:		6
CSI 690	Numerical Methods	
CSI 695	Scientific Databases	
CSI 702	High-Performance Computing	
CSI 703	Scientific and Statistical Visualization	
Total Credits		6

Areas of Emphasis Courses

From the list below, students are advised to select six courses that correspond to areas of emphasis in:

- *Computer Modeling and Simulation*- Including applications to the natural sciences
- *Data Science*- Including computational learning, statistics, and data analytics

Select six courses (18 credits) from the following: [1]		18
CSI 500	Computational Science Tools	
CSI 501	Introduction to Scientific Programming	
CSI 672	Statistical Inference	
CSI 674	Bayesian Inference and Decision Theory	
CSI 676	Regression Analysis	
CSI 678	Times Series Analysis and Forecasting	
CSI 685	Fundamentals of Materials Science	
CSI 690	Numerical Methods	
CSI 695	Scientific Databases	
CSI 701	Foundations of Computational Science	
CSI 702	High-Performance Computing	
CSI 703	Scientific and Statistical Visualization	
CSI 709	Topics in Computational Sciences and Informatics	
CSI 721	Computational Fluid Dynamics I	
CSI 739	Topics in Bioinformatics	
CSI 740	Numerical Linear Algebra	
CSI 742	The Mathematics of the Finite Element Method	
CSI 744	Linear and Nonlinear Modeling in the Natural Sciences	
CSI 747	Nonlinear Optimization and Applications	
CSI 754	Earth Science Data and Advanced Data Analysis	
CSI 758	Visualization and Modeling of Complex Systems	
CSI 771	Computational Statistics	
CSI 772	Statistical Learning	
CSI 773	Statistical Graphics and Data Exploration	
CSI 777	Principles of Knowledge Mining	
CSI 780	Principles of Modeling and Simulation in Science	
CSI 782	Statistical Mechanics for Modeling and Simulation	
CSI 783	Computational Quantum Mechanics	
CSI 786	Molecular Dynamics Modeling	
CSI 787	Computational Materials Science	
CSI 788	Simulation of Large Scale Systems	
CSI 873	Computational Learning and Discovery	
CSI 876	Measure and Linear Spaces	
CSI 877	Geometric Methods in Statistics	
Total Credits		18

1 When choosing courses, avoid courses previously taken to fulfill the 'General Core Courses' requirement and only choose one 500-level course.

Colloquium/Seminar

The department offers weekly colloquia and seminar series to ensure that students are exposed to the latest developments at area research institutions. One credit may be chosen from:

CSI 898	Research Colloquium in Computational Sciences and Informatics	1
or CSI 899	Colloquium in Computational and Data Sciences	
or CSI 991	Seminar in Scientific Computing	
Total Credits		1

Electives

Electives should be chosen to bring the total number of credits to 72. Courses must be approved by the student's advisor and the graduate coordinator. Additionally,

- A maximum of 2 credits of CSI 898 Research Colloquium in Computational Sciences and Informatics, CSI 899 Colloquium in Computational and Data Sciences, and/or CSI 991 Seminar in Scientific Computing may be applied as electives.
- A maximum of two 500-level courses may be applied between both the 'Areas of Emphasis Courses' requirement and the 'Electives' requirement.
- CSI 796 Directed Reading and Research and CSI 996 Doctoral Reading and Research are the only allowable research-based courses that can be used as electives.
- The following courses may not be used as electives: CSI 798 Research Project, CSI 799 Master's Thesis, CSI 998 Doctoral Dissertation Proposal, and CSI 999 Doctoral Dissertation.
- Students may pursue interdisciplinary research that supplements the 'Areas of Emphasis Courses' and 'Electives' requirements with each other and also with bioinformatics, climate dynamics, computational chemistry, computational social science, geoinformation sciences, and several other autonomous PhD program areas within the College of Science.

Doctoral Research

No more than 24 combined credits from CSI 998 Doctoral Dissertation Proposal and CSI 999 Doctoral Dissertation may be applied toward satisfying doctoral degree requirements, with a minimum of 6 credits of CSI 999 Doctoral Dissertation. Students become eligible to register for CSI 998 Doctoral Dissertation Proposal upon having an approved dissertation committee. Upon advancement to candidacy, students will be eligible to register for CSI 999 Doctoral Dissertation.

Select 24 credits from the following:		24
CSI 998	Doctoral Dissertation Proposal	
CSI 999	Doctoral Dissertation	
Total Credits		24

Candidacy Examination

The student must successfully complete separate written, computational, and oral candidacy examinations prepared and administered by the student's dissertation committee.

Dissertation Proposal and Advancement to Candidacy

Students advance to doctoral candidacy by fulfilling the following requirements:

- The student must successfully complete all coursework and candidacy examinations as stated above.

- The student prepares a dissertation proposal describing in detail the planned dissertation research. The proposal must be approved by the dissertation committee.
- Following successful completion of the research proposal and candidacy exams, the committee will recommend the student for advancement to doctoral candidacy to the graduate coordinator and the college's associate dean.

Dissertation Research and Defense

After advancing to candidacy, the student will work on a doctoral dissertation while enrolled in CSI 999 Doctoral Dissertation. The dissertation is a written piece of original contribution that demonstrates a doctoral candidate's mastery of the subject matter. A student is expected to produce new and original research worthy of publication in peer-reviewed journals. After the dissertation is completed, the committee will review the dissertation and examine the student in a public oral dissertation defense.

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 the higher degree level)?

Which existing approved program(s)?

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

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 instructional 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 Designation

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 substance equivalent to a sustainability-focused course.

Relationship to Existing Courses

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

Does this program cover material which crosses into another department? No

Impacted Departments

Additional Attachments

SCHEV Proposal

Executive Summary

Reviewer Comments

Additional Comments

Is this course required of all students in this degree program? %wi_required.eschtml%

Attached Document %attach_document.eschtml%

Key: 25