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

Last approved: 03/14/18 1:27 pm

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Changes proposed by: jbazaz

Catalog Pages Using this Program

Computational Sciences and Informatics, PhD

In Workflow

1. **CDS Chair**
2. SC Curriculum Committee
3. SC Associate Dean
4. SC CAT Editor
5. Assoc Provost-Graduate
6. Registrar-Programs: Duration
7. Registrar-Programs

History

1. Oct 23, 2017 by clmig-jwehrheim
2. Feb 15, 2018 by Rebekah Zacharias (rzachari)
3. Mar 14, 2018 by pchampan

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

Yes

Requestor:

Name	Extension	Email
Karen Underwood	9298	kunderwo@gmu.edu

Effective Catalog: 2021-2022

Program Level: Graduate

Program Type: Doctoral

Degree Type: Doctor of Philosophy

Title: Computational Sciences and Informatics, PhD

Banner Title: **Computat Sci & Informatics PhD**

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):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Computational & Data Sciences

Jointly Owned Program? No

Justification

Adding another course option (CSI 899) for students to fulfill the colloquium/seminar requirement.

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 a regionally-accredited school in the United States. 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 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 a regionally accredited institution, 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 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:

Program Outcomes

Additional Program Information

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

Courses offered via distance (if applicable):

What is the primary delivery format for the program? Face-to-Face Only

Does any portion of this program occur off-campus?

No

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

No

Related Departments

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

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

Are you changing the total number of credits required for this program?

No

Are you changing the delivery format in any way (e.g adding an online option)?

No

Are you adding/removing a licensure option which was approved by SCHEV?

No

Will any portion of this program be offered at an off-campus location?

No

Will this program change affect any specialized accreditation?

No

Is the content of the new program closely related to that of an existing approved program?

No

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)?

No

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)?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program?

No

Percentage of total credits containing new course content, excluding gen ed courses for undergraduate programs ("New content" means content that is not currently included in an existing approved degree/certificate program.) Please choose a percentage (i.e. 0%-100%)

less than 25%

Are the total credits for the program increasing or decreasing by more than 3 credits?

No

Will any additional equipment/facilites be needed?

No

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Will any additional library/learning resources needed?

No

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Does this program cover material which crosses into another department?

No

Additional Attachments

SCHEV Proposal

Executive Summary

Reviewer Comments

Additional Comments

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

%wi_required.eschtml%

Key: 25