**Committee on Graduate Studies
Report to the Faculty
July 2023 - June 2024**

Introduction

William & Mary (W&M) identifies itself as a premier public research university, a designation that is as much tied to the excellence of its graduate programs as its reputation as an undergraduate liberal arts and sciences institution. Arts & Sciences (A&S) contributes to graduate education and graduate-level research through eleven selective programs: six are Ph.D. granting (Anthropology, American Studies, Applied Science, Computer Science, History, Physics), three offer terminal research master's degrees (Biology, Chemistry, Psychological Sciences) and two offer terminal professional master's degrees (Computational Operations Research, Public Policy). Note that Applied Science, Computer Science, Physics and Computational Operations Research (which is a Computer Science degree concentration) will move to the School of Computing, Data Sciences & Physics in Fall 2025. The strength of the graduate programs at W&M places us in a more competitive peer group, with higher average faculty salaries. Our competitiveness with peer and aspirational peer institutions helps attract new faculty, students, and staff, as well as instructional, research, and infrastructure resources that otherwise would not be available to us.

Aside from producing graduates with advanced training who are ready for leadership positions across a broad spectrum of careers, graduate studies in A&S contributes to another fundamental goal of any research university: meaningfully advancing the frontiers of knowledge in all represented disciplines. In several key areas, the contributions of graduate research assistants are considered essential to achieving this goal, and their presence is critical to recruiting and retaining the strongest research-active faculty. The inability to provide enough doctoral students to work with research-active faculty members has caused some to leave W&M. The departure of these research-active faculty members represents a substantial scholarly, pedagogical, and financial loss to the University.

The research conducted by A&S graduate programs also enables a large proportion of the undergraduate research opportunities offered on campus, including in research areas that would not be available otherwise. Graduate students help mentor undergraduate researchers and facilitate faculty-undergraduate research collaborations. As undergraduate research is an important component of W&M's mission, recruiting and supporting research-active graduate students also strengthens our ability to deliver a distinctive undergraduate educational experience. In addition, A&S

graduate students enrich the undergraduate program by serving as tutors, writing preceptors, lab and discussion section leaders, teaching assistants, instructors, and graders in courses with high enrollments and those central to the COLL curriculum.

Report Items

- *GPA requirements for admission.* On December 14, 2023, COGS revised the minimum grade point average (GPA) requirements for applicants who may be admitted into an A&S graduate program. Applicants were previously required to have a minimum GPA of 3.0 on a 4.0 scale in a bachelor's degree program at an accredited institution.   COGS voted to allow students who have prior graduate degrees to substitute the cumulative grade point average for their most recent graduate degree to satisfy the admissions GPA requirement. This change acknowledges that an applicant's record in their most recent degree program may be a more accurate indicator of future success. The motion passed without dissent.

- *International applicant admissions deadlines.* In the same meeting, COGS clarified the Graduate Course Catalog regulations on the admission of international students. Previously, the admission of an international student was not allowed later than three months before the first day of classes, due to the substantial risk that visas would not be obtained in time. The catalog wording was changed to allow international students who have valid F-1 or J-1 visa records that are transferable from another US institution to be admitted up to one month before the start of classes, the same cutoff that applies to domestic applicants. This change was motivated by the observation that there are usually no significant delays when F-1 or J-1 visa records are active and transferable from other US institutions. The motion passed unanimously.

- *COGS procedures for handling student petitions.* The Vice Dean informed COGS on February 9, 2024 that there would be an immediate change in COGS procedures for handling student petitions: Based on advice from University Counsel, complete student petitions will not be included in the COGS agenda or minutes. Counsel indicated that it is best practice to keep FERPA-protected student records separate from public documents, since those items would require redaction if the agenda or minutes were every subject to a FOIA request. Student petitions are now made available for voting members in a Box folder prior to COGS meetings; the agenda and minutes refer to the petition without including identifying or FERPA-protected information. A one-page memo is sent via email from the Vice Dean with a summary of the vote results directly to the A&S Graduate Registrar with a copy to the Program Director and Program Administrator. A copy is also be placed in the student's file. The A&S Graduate Registrar takes the lead on implementing the approved action from the petition.

- *Admissions Summary.* The Directors of Graduate Study typically review the outcome of the admission season in the last COGS meeting of the spring semester, with results summarized in the Minutes.   The Vice Dean and the Assistant Dean for Graduate Studies replaced this ritual with a more efficient reporting procedure in which the Directors of Graduate Study provide their findings on a standardized Qualtrics survey.   Some of the numerical results for the last admission season are shown below, as reported in the final COGS meeting of the Spring 2024 semester. (Updated data is used in the table that appears in Appendix II of this report.) To review the narrative descriptions submitted by each unit, please see the Minutes of the COGS meeting on May 3, 2024

Program	Completed Applications	Incomplete Applications	Total Accepted Offers	Total Female Applicants Accepting Offers	Total International Applicants Accepting Offers
History, PhD	54	31	6	4	1
History, MA	46	23	10	5	0
COR, MS	24	20	12	3	4
PSYC, MS	194	52	9	9	2
Physics, PhD	65	34	11	6	6
APSC, PhD	51	154	10	4	7
CSCI, MS	54	155	10	2	3
CSCI, Bridge MS	8	5	1	1	0
CSCI, PhD	143	120	19	4	18
CHEM, MS	12	31	5	4	0
AMST, MA	8	19	3	3	0
AMST, PhD	19	24	4	2	1
Biology, MS	51	5	8	3	2
ANTH, PhD	38	15	4	3	2
ANTH, MA	21	5	5	5	0
MPP	60	19	15	8	0

- *Implementation of the new cross-level-listing policy.* COGS began implementation of the new University policy on the cross-level listing of undergraduate and graduate courses. Graduate students in a cross-level listed course are expected to do more advanced work with higher expectations for learning outcomes; this must be clearly indicated in the graduate course syllabi. Details of the policy can be found here: https://www.wm.edu/offices/ce/policies/academic-affairs-student-life/cross-level-listing.php During the spring and summer of 2024, COGS reviewed the syllabi of more than 60 cross-level listed course pairs, voted on each, and forwarded the results to the Registrar and the Office of Institutional Accreditation and Effectiveness.

  For those members of the Faculty of Arts & Sciences interested in further details regarding COGS discussions and decisions, copies of the COGS minutes are available upon request from the Office of Graduate Studies.

  Updates from the A&S Office of Graduate Studies (OGS):

- *Graduate Research Symposium.* In 2023-24, the A&S Office of Graduate Studies, the Graduate Center (led by Sarah Glosson) and the Charles Center (led by Elizabeth Harbron) organized the "Graduate & Honors Research Symposium" which involved both graduate students and undergraduate honors thesis students. At the recommendation of the Director of the Graduate Center, and after consultation with COGS, it was decided that a "Graduate Research Symposium," without undergraduate participation, will be offered in 2024-25 and beyond. This decision was motivated, in part, by a desire to avoid logistical problems in a combined graduate and undergraduate student event. In addition, OGS and COGS felt strongly that the event should return to its past graduate-student focus, should strive to enhance the participation of graduate students from other institutions in Virginia (who had been invited to participate in the past), and should further engage the students in William & Mary's new School of Computing, Data Sciences and Physics.

- *Broadening the GSAB.* The Graduate Studies Advisory Board is a donor organization that has supported graduate studies in Arts & Sciences, including financial support for Graduate Student Association activities (for example, their popular journal club) as well as various grants and awards that support graduate student research and scholarship. With the creation of the new school of Computation, Data Sciences & Physics (CDSP), and in response to a recommendation from the Vice

Dean for Research and Graduate Studies, the GSAB voted unanimously in its Spring 2024 meeting to begin the process of redefining itself as a board that supports graduate study in both A&S and CDSP. The Board will move forward with adjustments to its bylaws and quasi-endowment.

- *The Graduate Center.* As reported in the 2022-23 COGS Annual Report, a request for space was approved last academic year for a graduate center located in Ewell Hall.   The new Graduate Center, which occupies the space that was formerly the Music Library, opened for business in February 2024. The Graduate Center provides a central location for graduate professional development activities and courses, as well as graduate student social interaction.

- *New Doctoral Programs.* On April 26, 2024, the Math Department voted unanimously to propose the creation of a new doctoral program. During the 2023-24 academic year, the Vice Dean for Research and Graduate Studies provided feedback and guidance on the development of the Math Department's proposal, in consultation with the Dean of the Faculty of Arts and Sciences, the Vice Provost for Academic Affairs and the Vice Provost for Research. Evaluation of the proposal by the Dean and Provost is ongoing.

Course Approvals and Revised Degree Requirements

GRADUATE REGULATIONS

The following changes were approved by COGS on 10/19/2023.

Standard Registration Status

With the approval of the Committee on Graduate Studies, 500-level and 600-level graduate courses may be cross-level listed with undergraduate classes. The distinction in course levels between the graduate and undergraduate offerings must not exceed two levels (e.g., 400 and 600). Students enrolling in the graduate version of the course should expect additional requirements and higher standards of evaluation. For details, see https://www.wm.edu/offices/ce/policies/academic-affairs-student-life/crosslevel-listing.php.
Under no circumstances may any student receive separate credit for both cross-level listed courses.

~~With the approval of the Committee on Graduate Studies, 500-level graduate courses may be cross-listed with 400-level undergraduate courses. There are higher expectations and additional requirements for students taking the 500-level version of the course. Under no circumstances may any student receive credit for both the 400-level and 500-level versions of the same cross-listed course.~~

A&S: Admission

The following changes were approved by COGS on 12/14/2023.

Degree Seeking Students

For admission an applicant must have completed the requirements for a bachelor's degree at an accredited institution, must have a cumulative grade point average of 3.0 or more on a 4.0 scale, and must have the recommendation of the graduate committee in the program in which he or she intends to study for a degree. For those applicants who also have prior graduate degrees, the cumulative grade point average for the most recent graduate degree at an accredited institution can substitute to satisfy the GPA requirement. The requirement of a minimum cumulative grade point average of 3.0 can be waived. The petition for such a waiver is handled by the Arts & Sciences graduate program to which the candidate is seeking admission, with approval for the waiver at the discretion of the Committee on Graduate Studies and the Vice Dean for Research and Graduate Studies The waiver must be approved before a departmental recommendation for admission is communicated to the applicant.

All recommendations for admission, except for non-degree seeking students, must be approved by the Vice Dean for Research and Graduate Studies. No student will be admitted later than one month before the start of the semester. Because of the time required to obtain a student visa, an international student who does not have a valid F-1 or J-1 record that is transferable from another US institution may not be admitted later than three months before the start of the semester.

AMERICAN STUDIES

The following changes were approved by COGS on 04/05/2024.

COGS approved cross-level listing for AMST 490 Digital Humanities: Theory and Practice /590 Digital Humanities: Theory and Practice.

ANTHROPOLOGY

The following changes were approved by COGS on 04/05/2024 and 04/29/2024.

COURSE REQUIREMENTS

ANTH 545 - Special Topics in Anthropology

Fall and Spring (variable 1-3 credits) Staff.

Areas of current research interest presented by resident and visiting faculty. Course may be repeated for credit when topics vary. Cross-listed with ANTH 470, ANTH 461, AMST 590

APPLIED SCIENCE

The following changes were approved by COGS on 04/05/2024.

COURSE ADDITIONS:

APSC 621 - Applied Solid State Science

Fall (4)

Students learn advanced concepts for bonding, macromolecular ordering, and structure-

property relationships in materials. The course begins with macromolecular bonding as it relates to material dipoles, crystallographic ordering, and surfaces/interfaces. The second unit focuses on processing and morphology involving metals, ceramics, polymers, composites, adhesives, plasticizes, and solvents. The final portion of the course considers material interactions (with other materials or with electromagnetic radiation). Feynman's Coupled States approach is invoked for determining energies of electronic states arising in solid materials. Reduction/oxidation potentials, acidity/basicity, corrosion, adsorption, adhesion, electronic mobility/polarizability, and optical phenomenon are discussed in the context of the perturbation or interaction of electronic states.

APSC 622 - Quantitative Materials Characterization

Fall (4)

This course presents a wide variety of means by which the properties and characteristics of materials can be experimentally determined. These include electrical, optical, acoustic, thermal, spectroscopic, and resonance methods. The objective is to discuss these separate means under the umbrella of fundamentals of interactions of matter with particles and waves. The course will address issues of data acquisition, such as sampling, discretization, and signal processing. Applications of these techniques to research in materials development, synthesis, processing, and in situ manufacturing. Cross-listed with CHEM 622

APSC 623 - Materials Science of Surfaces and Interfaces

Spring (3) Prerequisite(s): consent of instructor.

Fundamental and applied aspects of metal, inorganic, polymer and other organic surfaces. Solid/solid, solid/liquid and solid/vapor interfaces. Their structure and defects, thermodynamics, reactivity, electronic and mechanical properties. Applications depend on class interests, but have previously included microelectronics, soils, catalysis, colloids, composites, environment sensitive mechanical behavior, UHV single crystal studies, materials durability, batteries and fuel cells, vacuum science and technology, and surface bioactivity. Cross-listed with CHEM 623

The following changes were approved by COGS on 04/19/2024.

COURSE REQUIREMENT:

COGS approved increasing the number of credits for the DATA 690 course from "3" to "up to 6" variable credits. Description of course reflects (variable credits).

The following changes were approved by COGS on 05/07/2024.

COURSE REQUIREMENTS:

APSC 629 - Optical Microscopy - Fundamental & Applications

Fall (3) Schniepp. Prerequisite(s): Instructor Permission

For centuries, optical microscopy has been an essential tool for fundamental research and applications in physical sciences, life sciences, and engineering alike. This course first introduces the fundamentals of optics necessary to rigorously understand the imaging and contrasting mechanisms of optical microscopes and their capabilities, including the wave nature of light and the resulting diffraction limit. Opportunities, limitations, and practical aspects of optical imaging are then discussed. The course then treats optical microscopes, their different modes of imaging/spectroscopy operation, and their application. Some of the latest technological developments and advancements of light microscopy are introduced. Cross-listed with APSC 429

BIOLOGY

The following changes were approved by COGS on 11/16/2023.

DEGREE REQUIREMENTS:

Students may be considered for Spring matriculation. For students matriculating in a spring semester, a schedule for research advisor and thesis committee selection, committee meetings, and comprehensive exam dates must be developed by the student in consultation with her or his likely research advisor and approved by the Graduate Program Director.

The following changes were approved by COGS on 04/19/2024, 04/25/2024, 05/01/2024, 05/15/2024.

COURSE REQUIREMENTS

BIOL 504 - Topics in Biology

Fall and Spring (1-4) Staff.

Areas of special current research interest presented by resident and visiting faculty members as opportunity and demand arise. Hours to be arranged. Cross-listed with BIOL 401, BIOL 404, BIOL 413, BIOL 460 This course may be repeated for credit.

BIOL 517 - Population and Community Ecology

Spring (4) Dalgleish. Prerequisite(s): BIOL 204 and BIOL 325 or BIOL 327 or any approved statistics course or equivalents

Discussion of the structure and dynamics of ecological populations and biotic communities.

Emphasis will be on environmental constraints and species interactions that control population growth and determine both diversity and similarities in community structure and function. Three class hours, three laboratory hours. Cross-listed with BIOL 417

BIOL 518 - Functional Ecology

Spring (3) Prerequisite(s): BIOL 302 or equivalent

Concepts and approaches in physiological ecology, biomechanics, and ecological morphology. The course emphasizes critical thinking, discussion, and student presentations on journal articles from the primary literature. Hypothesis formulation and methods of data collection and analysis will be studied. Three class hours. Cross-listed with BIOL 460

BIOL 533 - Developmental Biology

Spring (3) Saha. Prerequisite(s): BIOL 203, BIOL 204, and BIOL 310 or equivalent.

An introduction to embryonic and postembryonic developmental processes in animals emphasizing cellular differentiation, the generation of form and shape, growth regulation, cellular recognition and communication, molecular control mechanisms of gene expression, developmental neurobiology, and cancer. Three class hours. Cross-listed with BIOL 433

BIOL 542 - Molecular Genetics

Fall (3) Allison. Prerequisite(s): BIOL 203, 204, 310 or permission of instructor.

This course gives a comprehensive introduction to molecular genetics emphasizing genome organization, DNA replication and repair, synthesis of RNA and proteins, regulation of prokaryotic and eukaryotic gene expression, epigenetics, RNA processing, molecular genetics of cancer, DNA biotechnology and human gene therapy. Three class hours. Cross-listed with BIIOL 442

BIOL 545 - Geographical Information System for Biologists

Fall. (3) Leu.

This hands-on course will integrate Geographical Information Systems into biological research. Emphasis will be on developing spatial metrics, comparing cell or land cover patterns across spatial or temporal scales, classifying satellite or medical imagery, and modeling species distributions. Cross-listed with BIOL 445

BIOL 553 - Protein Structure and Function

Fall (3) Hinton. Prereq/Corequisite(s): BIOL 310, BIOL 314 or CHEM 314 or consent of instructor

The functionality of a protein is an integral part of its structure. This course provides a comprehensive analysis of how to use sequence data to understand a protein's physical properties, and to predict its function and interaction. Three class hours. Cross-listed with BIOL

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CHEMISTRY

The following changes were approved by COGS on 04/05/2024.

COURSE REQUIREMENTS

CHEM 501 - Advanced Physical Chemistry

Fall (3) Kidwell.

Quantum chemistry and molecular spectroscopy. Cross-listed with CHEM 401

CHEM 515 - Advanced Biochemistry

Fall (3) Landino.

A continuation of the study of biological processes on a molecular level begun in CHEM 314 or BIOL 314. Membrane biochemistry, molecular immunology, protein structure and function, biochemical applications of genetic engineering, and other topics of current interest. Cross-listed with CHEM 415

CHEM 519 - Bioinorganic Chemistry

Fall (3) Bebout. Prerequisite(s): One semester of Biochemistry, equivalent to CHEM 314 or BIOL 314

An intensive examination of current research approaches in the field of bioinorganic chemistry. Students will gain experience in reading and critically analyzing articles from the primary literature. Cross-listed with CHEM 419

CHEM 557 - Organic Synthesis

Fall (3) Speight.

An advanced treatment of organic synthetic methods which includes examples of natural products preparations. Cross-listed with CHEM 457

COMPUTER SCIENCE

The following changes were approved by COGS on 04/19/2024.

COURSE REQUIREMENTS

CSCI 515 - Systems Programming

Spring (3) Prerequisite(s): Computer Organization.

The design and implementation of programs which provide robust and efficient services to

users of a computer. Macro processors; scripting languages; graphical interfaces; network programming. Unix and X are emphasized. ==Cross-listed with [CSCI 415]==

CSCI 527 - Computer Graphics

Fall 3 Prerequisite(s): Linear Algebra, Algorithms, Computer Organization.

An introduction to computer graphics and its applications. Topics include coordinate systems, the relationship between continuous objects and discrete displays, fill and flood algorithms, two-dimensional geometric transformations, clipping, zooming, panning, and windowing. Topics from three-dimensional graphics include representations for objects, geometric and projection transformations, geometric modeling, and hidden line/surface removal algorithms. ==Cross-listed with [CSCI 427]==

CSCI 534 - Network Systems and Design

Spring (3) Prerequisite(s): Systems Programming, or permission of instructor.

The Internet; principles and design of network applications, including web servers and multimedia; transport, network and data link layers; network security; network performance evaluation and capacity planning. ==Cross-listed with [CSCI 434]==

CSCI 535 - Software Engineering

Spring 3 Prerequisite(s): Programming Languages.

The software life cycle. Software design methodologies. Testing and maintenance. Programming teams. ==Cross-listed with [CSCI 435]==

CSCI 536 - Data Mining

(3) Prerequisite(s): CSCI 303 and MATH 211 and MATH 212

The past few years have witnessed a boom of big data in different areas, including commercial platforms, healthcare, social networks, business, finance and more. Extracting useful and valuable information from big data can help improve quality of life and make our world a better place. The goal of this course is to introduce the fundamental concepts and techniques in data mining. Specifically, this course will cover the basic data mining concepts, graph mining, traditional clustering and classification models as well as the latest deep learning techniques. This course can help undergraduate students find a position of data scientist after graduation and do some data mining related projects for post-graduate study. In this course, students are required to do machine programming assignments, and take midterm and final exam. ==Cross-listed with CSCI 436==

CSCI 545 - Mobile Application Security

Prerequisite(s): CSCI 301 (Software Development) Note: CSCI 545 students will complete an independent research project, culminating in a 10-12 page conference-style research paper,

for 40% of the credit; instead of the predefined undergraduate project.

The course will cover topics including (but not limited to) security basics, application of crypto in mobile apps, storage in mobile applications, secure network communications, inter-application data flows, user privacy, static and dynamic analysis, manual analysis, using NLP in application analysis, and other emerging topics. Cross-listed with CSCI-445

CSCI 554 - Computer and Network Security

Spring (3) Prerequisite(s): Computer organization, programming, basics of operating systems, networks and computer architecture

An introduction to the principles and practices of cryptography, network security, and secure software. Cryptography topics include: basic methods, key distribution and protocols for authenticated and confidential communications. The practice of network security includes: Kerberos, PGP, public key infrastructures, SSL/TLS, IP security, intrusion detection, password management, firewalls, viruses and worms, and Denial of Service (DoS) attacks. Cross-listed with [CSCI 454]

CSCI 564 - Applied Cybersecurity

Fall or Spring (3) Prerequisite(s): Unix/Linux command line; Basic networking; Languages: C, Javascript, PHP, SQL

This is a systems-level security course involving hands-on labs, lecture, student presentations and a term project. Students will learn about secure systems design, vulnerabilities and how to defend against attacks to network, hardware and software components covering security issues and defenses from IoT to the cloud. Lab exercises will teach students how vulnerabilities work and how to document and mitigate them. Cross-listed with CSCI 464

The following changes were approved by COGS on 05/03/2024.
COURSE REQUIREMENTS

CSCI 516 - Introduction to Machine Learning

(3) Prerequisite(s): Algorithms, Linear Algebra

Machine learning (ML) is the study of predictive models whose performance can be improved by incorporating additional data or experience. This course will give an overview of the theory and practice of machine learning, focusing primarily on deterministic ML methods for classifcation and regression. Topics include decision trees, linear and nonlinear regression, artifcial neural networks, support vector machines and kernel methods, ensemble methods, clustering methods, dimension reduction techniques, mixture models, and naive Bayes methods. We will also look at practical concerns such as performance evaluation, data preprocessing, and hyperparameter tuning. Cross-listed with CSCI-416

CSCI 520 - Elementary Topics

Fall or Spring 1, 2, or 3 credits, depending on material

Will be published in the registration schedule. A treatment of elementary topics of interest not routinely covered by existing courses. Material may be chosen from various areas of computer science. Cross-listed with [CSCI 420] This course may be repeated for credit.

The following changes were approved by COGS on 05/15/2024.
COURSE ADDITIONS

CSCI 677 - Systems Security

Focuses on recent advances in computer systems security, including both attacks and countermeasures. Attacks that exploit hardware vulnerabilities and hardware and software protections from these attacks are explored. Specific topics include memory corruption attacks, control flow attacks, return-oriented programming attacks and their variations, side-channel attacks, speculative execution attacks (Meltdown & Spectre), trusted computing systems and secure architectures, malware detection techniques, and operating system security.

CSCI 656 - Machine Learning Systems

Examines the growth of diverse applications of Machine Learning (ML) in production, the continued growth in data volume, and the complexity of large-scale learning systems artificial intelligence, machine learning, and system design. Explores system design for supporting large- scale ML applications, and how to use ML to optimize resource usage in computer systems.

CSCI 546 - Neural Networks for Machine Learning

Foundational topics in pattern recognition and machine learning such as probability distributions, linear models for regression, and linear models for classification are discussed. Examines nonlinear models for regression and classification, focusing on artificial neural networks.

HISTORY

The following changes were approved by COGS on 04/05/2024.
COURSE REQUIREMENTS

COGS approved cross-level listing for HIST 409 Public History /590 Topics in History: Public History and HIST 410 Early American Architecture/590 Topics in History: Early American Architecture.

PHYSICS

The following changes were approved by COGS on 11/16/2023.

COURSE REQUIREMENTS

COGS approved the creation and approval of two sections of PHYS-690 for cross-level listed with PHYS-482 courses.

PHYS 632 - Quantum Materials and Quantum Devices

3 Staff. Prerequisite(s): PHYS 621.

This a graduate-level course designed to introduce the basic concepts and methods for the theoretical description of quantum materials and quantum devices. The first part of the course focuses on the electronic properties of quantum materials. In the second part, the concepts of qubit, quantum gate, and quantum sensor are introduced, along with examples of their implementation based on quantum materials. Cross-listed with PHYS-432.

PUBLIC POLICY

The following changes were approved by COGS on October 19, 2023.

COURSE REQUIREMENTS

COGS approved a course stacked GOVT 455 - Seminar: Education Policy and Politics in the United States 4-credit undergraduate version with PUBP514 Topics in Public Policy 3-credit graduate version.

Graduate Arts & Sciences: Additional Graduate Courses

The following changes were approved by COGS on 11/16/2023.

COURSE REQUIREMENTS

DATA 641 - Network Analysis

Spring (3) Nwala. Prerequisite(s): previous programming experience

Networks are everywhere in our lives: networks of friends on social media, the Web, networks of neurons in our brains, etc. It's amazing that such a simple representation - dots and lines - can capture a variety of relationships, whether simple or complex. In this course, we will survey a broad range of fundamental topics in network science, relevant to students from data/computer science and engineering, informatics, business, biology, physics, statistics, social sciences, etc. For example, we will explore the properties of social networks and the key role of hubs, and how directed and weighted networks affect the spread of information and

misinformation in social media. These topics are important and useful in many job sectors from marketing to technology, management to design, and from biology to the arts and humanities. <mark>Cross-listed with DATA 445</mark>

The following changes were approved by COGS on 04/05/2024.

DATA 643 - Reinforcement Learning

Fall (3) Chen. Prerequisite(s): Background in Python, Statistics, Linear Algebra, Calculus, and introductory concepts in Machine Learning.

This course introduces the fundamentals of reinforcement learning (RL) and its applications in various domains. The students will be able to (1) understand the theoretical foundations of RL problems, (2) know how to formalize a problem as a RL problem, (3) understand a spectrum of existing RL algorithms such as Q-learning and policy gradient, and (4) how to implement a RL algorithm to the target problem of interest. There will be several hands-on projects throughout the course. Programming will be done in the Python language. By the end of the course, the students should be able to implement classical RL algorithms such as Q-learning and policy gradient and apply the RL algorithms to solve example real-world problems. <mark>Cross-listed with DATA 448</mark>

The following changes were approved by COGS on 04/05/2024.
COURSE REQUIREMENTS

MATH 551 - Probability

Fall and Spring (3) Prerequisite(s): Consent of instructor.

Topics include: combinational analysis, discrete and continuous probability distributions and characteristics of distributions, sampling distributions. <mark>Cross-listed with MATH 451</mark>

MATH 552 - Mathematical Statistics

Spring (3) Prerequisite(s): Consent of instructor.

The mathematical theory of statistical inference. Possible topics include: maximum likelihood, least squares, linear models, methods for estimation and hypothesis testing. <mark>Cross-listed with MATH 452</mark>

MATH 555 - Statistical Learning

(3) Prereq/Corequisite(s): MATH 451

Introduction to the theory of statistical learning techniques and application of these approaches to real data. Course broadly covers supervised and unsupervised learning, including topics in regression, classification, clustering, dimensionality reduction, model evaluation and selection. <mark>Cross-listed with MATH 455</mark>

Graduate Center Annual Report

Staff and Facilities

The Graduate Center organizes and sponsors a variety of activities, events, and zero-credit courses for graduate and professional students in Arts & Sciences. Sarah Glosson, Director of the Arts & Sciences Graduate Center, administers the Center, which, as of February 2024, finally has a physical location. The Graduate Center is now operating as a student-centered space in Ewell Hall room 250.

In Fall 2023, Spring 2024 and Summer 2024, three W&M faculty and staff members taught ten Graduate Center courses. The Graduate Center continued to work collaboratively with other W&M offices and schools to offer a range of activities and events that enhance the graduate experience of A&S graduate students. This included responsibility for the annual Graduate Research Symposium.

Graduate Center Highlights

Appendix I provides a listing and summary of participation in selected Graduate Center activities, events, and courses since Fall 2012.

- **GRAD Courses**: Total course enrollment for Fall 23, Spring 24, and Summer 24, was 103 students enrolled across ten courses. The students enrolled were a mix of domestic and international graduate students. The English language courses continue to be successful. Increasingly, to better fit students' schedules and research demands, GRAD courses are offered as one-week "boot camps" rather than as 10-week courses and sometimes now include asynchronous components to help students fit the courses into their schedules.
- **3MT**: The Three Minute Thesis competition was offered as a signature event of the Graduate & Honors Research Symposium. Seven graduate presenters competed for cash prizes. A large audience of over 200 participated and enjoyed a reception after the conclusion of the competition.
- **Emerging Scholars Series:** In partnership with the Williamsburg Regional Library (WRL), the Graduate Center hosted six public talks open to the local community. These talks featured master's and doctoral students from history, physics, American studies, biology, and chemistry, and reached a total audience of 157, the largest number since the program began in 2018. The WRL reports that these are some of their most well attended and popular talks.
- **Graduate Writing and Communication Center**: The Graduate Center partners with the recently renamed Writing and Communication Center (WCC) to offer graduate-level writing consultation at the Graduate Writing and Communication Center (GWCC). In 2023-24, 4 graduate students were hired and trained in peer writing consultation at the graduate level. The GWCC offered both online and in-person consultation to accommodate student needs. The GWCC also instituted Writing Sprints (mini writing retreats) in Summer 2024, conducted both in person and online.
- **Professional Development Workshops**: In partnership with individual graduate programs, W&M Libraries, the Cohen Career Center, the Wellness Center, and the Reves Center, the Graduate Center offered/supported 8 unique workshops (some repeated) on a variety of topics including academic writing, career conversations, CVs and resumes, teaching statements and diversity statements, science writing tips, scholarly publishing and author's rights, digital humanities, and more. Attendance across all workshops totaled roughly 95 attendees.
- **GSAB Mentoring Program**: The goal of this program is to foster one-on-one mentorships intended to help students build professional skills. Due to the time constraints posed by moving offices twice in twelve months and managing renovations to Ewell 250 in preparation to set up the new Graduate Center space, this program was put on hiatus for 23-24.

- **Graduate & Honors Research Symposium**: The Symposium was held in collaboration with the Charles Center for the second year. The GHRS took place March 20-21, 2024, the symposium featured 144 poster and panel presentations by graduate and honors students representing Arts & Sciences, as well as graduate students from other regional institutions.

Other Activities Sponsored by the Office of Graduate Studies
- **Newsletter**: The "Graduate A&S Newsletter" is distributed by email to A&S graduate students as well as faculty and staff affiliates every Monday during the academic year. Each academic year there are approximately thirty issues of the newsletter. Entries include links to events posted in the A&S Graduate Studies & Research Events Calendar, as well as to webpages containing pertinent information.

A&S Graduate Ombudsperson Report for August 2023 – June 2024

Peter Vishton, Associate Professor, Psychological Sciences

A total of 11 graduate students contacted the ombudsperson for consultation about a wide-range of issues including payroll, medical leaves, complaints about conduct, student-teacher conflicts, advisor-advisee relationships, work relationships, and allegations of psychological abuse and retaliation.

The ombudsperson conducted two informational meetings with graduate students from two different departments. The ombudsperson also participated in welcome events for new graduate students arranged by the Dean for Diversity, Equity, and Inclusion.

In all cases, the ombudsperson helped by directing the graduate students to the appropriate entity within A&S or assisting in devising solutions that would serve the graduate students' best interests. The ombudsperson provided relevant information, acted as mediator, and proposed possible courses of action. For one case, the ombudsperson contacted a Graduate Director, Department Chair, and two Deans to confirm that proper procedures were being followed.

The time-scale of these incidents varied widely. The simplest matters were resolved in a single meeting. More complex matters required several weeks of meetings and discussions.

The ombudsperson participated in graduate A&S orientation events and the bi-weekly meetings of the Committee on Graduate Studies (COGS) throughout the academic year, with the goal of maintaining close contact with the graduate programs of Arts and Sciences.

All cases have been resolved.

Committee on Graduate Studies Members, 2023-24

Chris Carone, Chair
Liz Losh, American Studies
Neil Norman, Anthropology
Dan Runfola, Applied Science
Joshua Puzey Biology
Bill McNamara, Chemistry
Denys Poshyvanyk, Computer Science
Rex Kincaid, Computational Operations Research
Kathy Levitan, History
Mike Kordosky, Physics
Cheryl Dickter, Psychological Sciences
Elaine McBeth, Public Policy

Appendices

GRADUATE CENTER PARTICIPATION
Fall 2019 - Summer 2024

Course	F 19	S 20	Summer 20	F 20	S 21	Summer 21	F 21	S 22	Summer 22	F 22	S 23	Summer 23	F 23	S 24	Summer 24
GRAD 501	5			4			4			4			12		
GRAD 502					3			4			6			13	
GRAD 503	5	9		8			7			8			9		
GRAD 505		9			10			9			10			10	
GRAD 510	8			11	5	17	10	10		4			15		
GRAD 512	6														
GRAD 520	6				5			10			6		11		
GRAD 522	5			5											
GRAD 529			8		8				5			6			8
GRAD 530	9	9		8	8		8	7		5	5		8	8	
GRAD 540 001		3		6											
GRAD 540 002															
GRAD 560								10		4			9		
Course Subtotals	**44**	**30**	**8**	**42**	**39**	**17**	**39**	**40**	**5**	**25**	**27**	**6**	**64**	**31**	**8**
Workshops	**F 19**	**S 20**	**Summer 20**	**F 20**	**S 21**	**Summer 21**	**F 21**	**S 22**	**Summer 22**	**F 22**	**S 23**	**Summer 23**	**F 23**	**S 24**	**Summer 24**
Job Market for the Humanities				6	10	8					9				8
Prep for Provost Disseration Fellowship Application	12			14			10			15				9	
CV for the Sciences				3											
Preparing for the Scientific Job Market		10			15										
Alt-Ac-Careers		5						7							
ETD/Copyright/Embargo															
Digital Identity Roundtable/Digital Scholarship						23		2	22	3					
Writing Skills for Sciences	24			21			21			21			40		
Bibliographies & Citations Made Easy	13									2					
Author's Rights & Publishing	2						6	1		3				8	
Elevator Pitch/public speaking (Symposium)											3				
Career Development Series (various topics)							5	4			9			5	
GWRC Workshop Series (various topics)							23	18		31			3		26
3MT Presentation Workshop(s)	11										24			21	
Workshop Subtotals	**62**	**15**	**0**	**44**	**25**	**31**	**65**	**32**	**22**	**75**	**45**	**0**	**43**	**43**	**34**
Programs	**F 19**	**S 20**	**Summer 20**	**F 20**	**S 21**	**Summer 21**	**F 21**	**S 22**	**Summer 22**	**F 22**	**S 23**	**Summer 23**	**F 23**	**S 24**	**Summer 24**
Graduate Research Symposium		*			*			*			600			550	
Raft Debate		*			*			*			**			**	
Program Subtotals	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**600**	**0**			
GRAND TOTAL	**106**	**45**	**8**	**86**	**64**	**48**	**104**	**72**	**27**	**100**	**672**	**6**			

*due to COVID-19 the GRS and Raft Debate were postponed
**Raft Debate is on hold until Fall 2024

APPLIED, ACCEPTED and ENROLLED *
Fall 2019 - Fall 2023

		Applied	Accepted		Enrolled		Avg UG[1]
			Total	Rate	Total	Rate	GPA
American Studies	2019	24	13	54%	6	46%	3.10
	2020	33	19	58%	9	47%	3.60
	2021	40	15	38%	8	53%	3.40
	2022	37	19	51%	9	47%	3.75
	2023	29	16	55%	9	56%	3.66
Anthropology	2019	47	11	23%	6	55%	3.40
	2020	33	7	21%	6	86%	3.80
	2021	50	10	20%	9	90%	3.50
	2022	23	7	30%	6	86%	3.83
	2023	45	9	20%	9	100%	3.67
Applied Science	2019	20	6	30%	4	67%	3.74
	2020	13	6	46%	6	100%	3.30
	2021	12	4	33%	3	75%	3.50
	2022	5	3	60%	3	100%	3.59
	2023	42	11	26%	9	82%	3.43
Biology	2019	56	17	30%	8	47%	3.60
	2020	44	8	18%	8	100%	3.60
	2021	129	10	8%	7	70%	3.50
	2022	45	9	20%	9	100%	3.53
	2023	28	9	32%	8	89%	3.55
Chemistry	2019	13	6	46%	6	100%	3.30
	2020	18	5	28%	5	100%	3.60
	2021	16	7	44%	5	71%	3.90
	2022	18	4	22%	4	100%	3.51
	2023	8	6	75%	6	100%	3.67
Computer Science [2]	2019	100	35	35%	22	88%	3.10
	2020	105	28	27%	24	86%	3.40
	2021	102	50	49%	28	56%	3.70
	2022	124	28	23%	25	89%	3.56
	2023	114	43	38%	37	86%	3.53
History	2019	96	17	18%	11	65%	3.60
	2020	97	29	30%	14	48%	3.30
	2021	86	30	35%	7	23%	3.70
	2022	107	20	19%	11	55%	3.90
	2023	104	38	37%	11	29%	3.79
Physics	2019	61	17	28%	8	47%	3.73
	2020	51	22	43%	8	36%	3.80
	2021	54	21	39%	9	43%	3.80
	2022	65	20	31%	12	60%	3.73
	2023	55	17	31%	7	41%	3.53
Psychological Sciences	2019	102	8	8%	7	88%	3.40
	2020	99	9	9%	8	89%	3.70
	2021	159	13	8%	8	62%	3.60
	2022	149	9	6%	9	100%	3.85
	2023	179	8	4%	8	100%	3.82
Public Policy[3]	2019	48	5	10%	4	80%	3.80
	2020	-	-	-	-	-	-
	2021	40	27	68%	9	33%	3.30
	2022	42	27	64%	9	33%	3.63
	2023	50	36	72%	15	42%	3.62

*Due to COVD-19 related difficulties in taking the GRE scores, Graduate Arts & Sciences suspended this requirement for applicants beginning in 2020. Submission was optional as additional information provided by applications. Not submitting GRE scores did not negatively impact consideration for admission.

[1] Average of UG transcripts submitted by enrolled students.

[2] This includes applicants to and students admitted to the Computational Operations Research master's program.

[3] For Fall 2020, Provost Agouris suspended admissions to the Master of Public Policy program.

APPENDIX III

GRADUATE STUDENT ENROLLMENTS[1]

Fall 2019 to Fall 2023

Department	Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023
American Studies	42	41	34	36	37
Anthropology	31	34	35	38	39
Applied Science	29	31	30	24	23
Biology	19	17	19	18	19
Chemistry	9	11	11	12	9
Computer Science[2]	79	82	83	88	106
History	48	42	45	51	49
Physics	51	50	52	54	51
Psychological Sciences	17	15	16	16	17
Public Policy	16	3	10	17	16
TOTALS	341	326	335	354	366

Notes:

[1] Totals include full-time, part-time and continuous enrollment registration, including combined degree students in Law, Business, and Education in 2023-2024.

[2] Includes Computational Operations Research.

APPENDIX IV
GRADUATE STUDENT ENROLLMENT BY DEGREE FALL 2023

Program	MA	MS	MA/PhD	MS/PhD	PhD	MPP	Total
American Studies	7		3		27		37
Anthropology	13		3		23		39
Applied Science		1		1	21		23
Biology		19					19
Chemistry		9					9
Computer Science		11		4	72		87
COR		19					19
History	11		1		37		49
Physics			1		50		51
Psychological Sciences		17					17
Public Policy (MPP)						16	16
	MA	**MS**	**MA/PhD**	**MS/PhD**	**PhD**	**MPP**	
Total Enrollment	**31**	**76**	**8**	**5**	**230**	**16**	**366**

APPENDIX V
GRADUATE DEGREES AWARDED DURING THE LAST 10 YEARS
(August 2014 – May 2024)

DEPARTMENT	PROGRAM INITIATED	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	SINCE AUG. 2013
American Studies	1982-MA	5	3	3	8	3	2	5	3	3	8	43
	1988-PhD	9	5	11	4	5	5	7	7	1	4	58
Anthropology	1979-MA	3	6	5	2	4	3	4	4	6	6	43
	2001-PhD	2	1	5	7	4	2	2	1	1	0	25
Applied Science	1970-MA/MS	2	2	0	2	7	1	1	0	2	3	20
	1990-PhD	6	2	5	5	3	9	2	4	9	2	47
Biology	1963-MA/MS	7	9	9	7	8	9	8	3	10	8	78
Chemistry	1964-MA/MS	8	4	4	7	7	4	3	5	6	7	55
Computer Science[1]	1984-MS	17	17	30	20	13	17	13	10	16	22	175
	1986-PhD	4	12	8	9	12	10	11	6	8	7	87
History	1955-MA	13	7	16	11	16	12	16	6	14	9	120
	1967-PhD	5	4	9	5	4	5	2	8	4	5	51
Physics	1959-MA/MS	5	7	18	12	6	10	6	10	6	11	91
	1964-PhD	7	9	16	16	14	4	6	11	7	3	93
Psychological Sciences	1953-MA	12	7	8	10	4	0	0	0	0	0	41
	2019-MS						2	5	12	10	7	7	43
Public Policy	1991-MPP	18	20	18	21	13	13	3	1	16	6	129
Totals	MA/MS/MPP	90	82	111	100	83	76	71	52	86	87	838
	PhD	33	33	54	46	42	35	30	37	30	21	361

[1] Includes Computational Operations Research.