GC Digital Initiatives

Courses in Computation and Digital Cultures Across the Curriculum at The Graduate Center

Spring 2017

In Spring 2017, 19 courses focused on computational practices and digital cultures will be offered across The Graduate Center's doctoral, master's, and certificate programs. Topics covered in these courses range from theorizing digital humanities to computer programming to statistical analysis, and provide hands-on opportunities for GC students to develop their digital research skills.

These courses are listed below in alphabetical order by program along with a brief description taken from their respective program websites. Interested students should contact individual programs if they have questions regarding course content/prerequisites or if permission is required.

For more information about the GC Digital Initiatives Program, please visit http://cuny.is/gcdi and http://cuny.is/gcdigitalfellows.

BIOL 79302 - Computational Molecular Biology (crn:35393)
****Permission from instructor required. Basic understanding of genomics and interest in learning computer programming for data analysis required.****
Prof. Konstantinos Krampis
DESCRIPTION: This course will introduce both bioinformatics theories and practices. Topics include database searching, sequence alignment, molecular phylogenetics, structure predication, and microarray analysis. The course is held in a UNIX-based instructional lab specifically configured for bioinformatics applications. Each session consists of a first-half instruction on bioinformatics theories and a second-half session of hands-on exercises.

CSC 83060 - Data Visualization (crn:35094)
Prof. Lev Manovich
DESCRIPTION: Coming soon!

CSC 84030 - Computational Neuroscience (crn:35090)
(Crosslisted with PSYC 87100.)
****Open to students in Biology, Biochemistry, Physics, Sociology, and Psychology.****
Profs. Theodore Raphan & Andrew Delamater
DESCRIPTION: Pattern Recognition, Artificial Intelligence, and Neural Modeling have a common history, which surged beginning in the 1950's, some of which has been subsumed

under the general heading of Machine Learning. The underlying theory and development of model-based analysis of data have been published in a wide range of journals, including physiological and experimental based journals. At the same time, the NASA space program engendered a strong interest in adaptive control theory, whose purpose was to investigate the design of systems that could adapt parameters to reflect changes in environmental conditions. Neurocomputing takes its model from biological systems and by the same token understanding of biological systems have benefited much from system theoretic and neural network models whose purpose is to mimic behavior and the physiological process. These methodologies have been important in neuroscience and in medicine and have impacted computational approaches. This course will introduce students to the mathematical models, computational methods, and experimental basis for learning processes in biological systems (animals and humans) and how modeling these systems has impacted computational algorithms. The topics that will be covered in this course will include elements of statistical decision theory, adaptive control, machine learning approaches to pattern classification, and neural nets, and will provide a formal structure for solving problems in behavioral, physiological and representation-mediated behavior. Students completing this course will have the background not only to apply this knowledge to research problems in behavioral and cognitive neuroscience and artificial intelligence, but also to pattern matching in other settings and natural language processing.

The learning goal of this course is to teach students how to meld what has been done in Pattern Recognition, Adaptive Control, Machine learning, and Neural Networks with the experimental results from behavioral learning and physiological findings on the underlying behavior of sensory motor systems. This course will achieve this learning goal by not only teaching students the mathematical and computational foundations of these techniques, but also introducing them to the applications in behaviorally and physiologically based studies. As there is no single text that covers the material proposed, students will be given reading assignments. An important goal of the course is for students to learn how to read and understand primary source material and papers.

CSC 84050 - Data Mining (crn:35102)
****Students must have some background in quantitative analysis and programming.****
Prof. Soon Chun
DESCRIPTION: Coming soon!

DCP 70200 - Methods Demographic Analysis (crn:35050)
(Crosslisted with SOC 81900.)
Prof. Frank Heiland
DESCRIPTION: This course gives students an overview of some of the major demographic methods used in the study of population, and includes the standard procedures for the measurement of fertility, mortality, natural increase, migration, and nuptiality. Students will learn

how to construct demographic rates, life tables, and population projections, and how to carry out standardization, decomposition of differences, analysis of fertility and nuptiality patterns, analysis invoking model life tables and stable population theory, and analysis of nonstable populations.

DCP 80300 - Spatial Demography (crn:35051)
(Crosslisted with SOC 81900.)
****Prerequisite: Introductory statistics including multiple linear regression; DCP 701 or permission of instructor.****
Prof. Deborah Balk
DESCRIPTION: This course provides an overview of spatial themes and techniques in demography. Examples will be drawn from many substantive areas (e.g., mortality, fertility, urbanization, migration, poverty). Students will learn about the spatial construction of place, basic mapping skills and spatial data creation as well as statistical methods to explore and model spatially-referenced data to answer demographic (and allied) questions. In the most advanced topics, students examine the special difficulties that spatial data may create for standard regression approaches, and learn models and approaches for undertaking multivariate regression analysis in the presence of spatial heterogeneity and/or spatial dependence. Emphasis in the course is evenly split between learning how to make maps and spatial analysis.

EPSY 70600 - Statistics and Computer Programming II (crn:35081)
****Prerequisite: 70500 or equivalent.****
Prof. David Rindskopf
DESCRIPTION: 70500 and 70600 form an integrated sequence covering descriptive statistics, point and interval estimation, hypothesis testing, t-tests, analysis of variance, correlation, regression (including elementary matrix algebra), repeated measures designs, cross-classified data, and the use of computer packages for these analyses.

EPSY 83500 - Categorical Data Analysis (crn:35085)
****Prerequisite: EPSY 83300 or permission of instructor.****
Prof. Jay Verkuilen
DESCRIPTION: This course presents the theory and application of methods for analyzing nominal and ordinal data, including the use of computer programs for performing these analyses. Methods covered include loglinear models, logistic regression, logit models, and latent class analysis.

EPSY 85000 - Technology, Learning, and Development (crn:35086)
(Crosslisted with UED 75200.)
Prof. Colette Daiute
DESCRIPTION: "Technology, Learning, and Development" is a review of theory, history, and research on contemporary uses of technology in education and human development. Given the explosion of technologically mediated life, how do we define and do research on learning and development? The course involves readings, lectures, class discussions, and writing to consider major concepts capturing the relevant functions of technologies, such as (but not limited to) interactive cultural tools, scaffolds, social media, digital storytelling, and digital data analysis. We also consider technologically-mediated development across the life span. Course activities include review of major theories of learning, development, and social change; application of theories to research on individual, community, and societal development; and digital supports for rigorous qualitative data analysis. We address issues requiring further critical inquiry, such as a focus on devices rather than human uses and lack of theoretically-driven research methods. Also emphasized are approaches to practice-based research, such as to scaffold collaborative learning activities and to use technological affordances for mediating across diverse individual, community, and virtual settings. Through out the course, we address issues of equal access, research purpose, and innovative research designs. Students present readings, participate in class discussions, and write three 7-page conceptual and research design papers. There are no prerequisites.

IDS 81670 - Digital Humanities: Methods/Practice (crn:35662)
(Crosslisted with MALS 75500.)
Prof. Lisa Rhody
DESCRIPTION: During the Fall 2016 semester, students explored the landscape of the digital humanities, examining a range of ways to approach DH work and proposing potential DH projects. In the spring, we will put that thinking into action. In this praxis-oriented course, we will split into teams and then develop and launch functional versions of projects first imagined in the fall. Students will complete the class having gained hands-on experience in the collaborative planning, production, and dissemination of a digital humanities project, and having picked up a variety of technical, project management, and rhetorical skills along the way. A goal is to produce projects that will have a trajectory and a timeline of their own that extends beyond the Spring 2017 semester. Students will be supported by a range of advisors matched to the needs of the individual projects, and successful completion of the class will require a rigorous commitment to meeting target delivery dates we will establish together at the outset.

The class will hold a public launch event at the end of the semester where students will present their proofs-of-concept, and receive feedback from the broader community.

ITCP 70020 - Interactive Technology and the University: Theory, Design, and Practice (crn:35022)
****Open to all GC students; if student hasn't completed the Core 1 course, meeting with ITP coordinator is required.****
Profs. Luke Waltzer & Alexandra Juhasz
DESCRIPTION: This second core course introduces students to IT in the classroom and in academic research, focusing on cognition and design. Interest areas include research in digital media; visualization and design; modes of learning within and outside the classroom; and conceptualization and production of educational media products. The course provides a hands-on introduction to key educational uses of digital media applications, including on-line writing tools, electronic archives, and experimentation in virtual spaces. Core II employs an interdisciplinary approach to the application of digital media to classroom teaching and scholarly research and presentations. Students will learn skills and concepts and then will design and plan a digital media project in their academic discipline. This course makes it possible for participating doctoral students to build on the theoretical insights gleaned in the first core course and to begin to conceive and develop an IT project in their own discipline.

LING 78000 - Corpus Analysis (crn:35135)
****Permission from instructor required.****
Prof. Rebecca Levitan
DESCRIPTION: This course will introduce students to the statistical methods most often used to analyze categorical, ordinal, and interval data in computational linguistics, psycholinguistics, and sociolinguistics. Topics will include descriptive statistics, correlation, regression, analysis of variance, logistic regression, and non-parametric tests. In the practicum for the course, students will use the statistical packages SPSS and R to analyze data representing a variety of linguistic phenomena.

LING 83800 - Intro to Computational Methods II (crn:35140)
****Permission from instructor required.****
Prof. Alla Rozovskaya
DESCRIPTION: Coming soon!

MALS 75500 - Digital Humanities: Methods/Practice (crn:35168)
(Crosslisted with IDS 81670.)
Prof. Lisa Rhody
DESCRIPTION: During the Fall 2016 semester, students explored the landscape of the digital humanities, examining a range of ways to approach DH work and proposing potential DH projects. In the spring, we will put that thinking into action. In this praxis-oriented course, we will split into teams and then develop and launch functional versions of projects first imagined in the

fall. Students will complete the class having gained hands-on experience in the collaborative planning, production, and dissemination of a digital humanities project, and having picked up a variety of technical, project management, and rhetorical skills along the way. A goal is to produce projects that will have a trajectory and a timeline of their own that extends beyond the Spring 2017 semester. Students will be supported by a range of advisors matched to the needs of the individual projects, and successful completion of the class will require a rigorous commitment to meeting target delivery dates we will establish together at the outset.

The class will hold a public launch event at the end of the semester where students will present their proofs-of-concept, and receive feedback from the broader community.

NURS 71200 - Applied Statistics II (crn:35213)
****Prerequisite: NURS 71100.****
Prof. Eileen Gigliotti
DESCRIPTION: This course introduces the student to the use of statistical techniques to answer clinically relevant questions, within the discipline of nursing. The focus of this second course in the two-semester statistics sequence is on developing a conceptual applied understanding of the uses and interpretation of statistics testing relationships between and amongst variables including correlation and linear models and their extensions to regression including multiple and hierarchical regression. Drawing on current nursing research, the case study method will be used to enhance the students' conceptual understanding by illustrating actual applications of particular statistical techniques.

PSYC 87100 - Computational Approaches to Learning & Modeling Adaptive Biological Systems (crn:35471)
(Crosslisted with CSC 84030.)
Profs. Theodore Raphan & Andrew Delamater
DESCRIPTION: Pattern Recognition, Artificial Intelligence, and Neural Modeling have a common history, which surged beginning in the 1950's, some of which has been subsumed under the general heading of Machine Learning. The underlying theory and development of model-based analysis of data have been published in a wide range of journals, including physiological and experimental based journals. At the same time, the NASA space program engendered a strong interest in adaptive control theory, whose purpose was to investigate the design of systems that could adapt parameters to reflect changes in environmental conditions. Neurocomputing takes its model from biological systems and by the same token understanding of biological systems have benefited much from system theoretic and neural network models whose purpose is to mimic behavior and the physiological process. These methodologies have been important in neuroscience and in medicine and have impacted computational approaches. This course will introduce students to the mathematical models, computational methods, and experimental basis for learning processes in biological systems (animals and humans) and how

modeling these systems has impacted computational algorithms. The topics that will be covered in this course will include elements of statistical decision theory, adaptive control, machine learning approaches to pattern classification, and neural nets, and will provide a formal structure for solving problems in behavioral, physiological and representation-mediated behavior. Students completing this course will have the background not only to apply this knowledge to research problems in behavioral and cognitive neuroscience and artificial intelligence, but also to pattern matching in other settings and natural language processing.

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SOC 81900 - Methods Demographic Analysis (crn:35365)
(Crosslisted with DCP 70200.)
Prof. Frank Heiland
DESCRIPTION: This course gives students an overview of some of the major demographic methods used in the study of population, and includes the standard procedures for the measurement of fertility, mortality, natural increase, migration, and nuptiality. Students will learn how to construct demographic rates, life tables, and population projections, and how to carry out standardization, decomposition of differences, analysis of fertility and nuptiality patterns, analysis invoking model life tables and stable population theory, and analysis of nonstable populations.

SOC 81900 - Spatial Demography (crn:35353)
(Crosslisted with DCP 80300.)
****Prerequisite: Introductory statistics including multiple linear regression; DCP 701 or permission of instructor.****
Prof. Deborah Balk
DESCRIPTION: This course provides an overview of spatial themes and techniques in demography. Examples will be drawn from many substantive areas (e.g., mortality, fertility, urbanization, migration, poverty). Students will learn about the spatial construction of place, basic mapping skills and spatial data creation as well as statistical methods to explore and model spatially-referenced data to answer demographic (and allied) questions. In the most advanced topics, students examine the special difficulties that spatial data may create for

standard regression approaches, and learn models and approaches for undertaking multivariate regression analysis in the presence of spatial heterogeneity and/or spatial dependence. Emphasis in the course is evenly split between learning how to make maps and spatial analysis.

UED 74100 - Quantitative Research Methods in Urban Education (crn:35201)
Prof. Juan Battle
DESCRIPTION: Coming soon!