TO: Faculty Council Members

FROM: Alan Freitag, Faculty President

DATE: April 19, 2010

RE: Consent Calendar

Attached is the Consent Calendar (See Article V, Section 3.A (3 & 4), J. (3 & 5) and K.3 of the Standing Rules of the Faculty Council.) consisting of these proposals:

- BINF 2-17-10 — Establishment of BINF 6010 and 8010, "Topics in Bioinformatics"
- BINF 3-10-10 — Establishment of a new Ph.D. program in Bioinformatics and Computational Biology
- BINF 3-11-10 — Establishment of a new Bioinformatics Technology Graduate Certificate Program
- BINF 3-12-10 — Establishment of a new Bioinformatics Applications Graduate Certificate Program
- GRAD 3-12-10 — Establishment of GRAD 8990, "Academic Integrity Training"
- MGMT 2-5-10 — Establishment MBAD 6166, "Ethics and Global Capitalism"
- MUSC 2-15-10 — Establishment of a new Graduate Certificate Program in Violin

Below are the catalog copy descriptions. If you wish to read the full proposals, they are posted on the Academic Affairs website.

If there are any objections regarding these proposals, they must be registered with the Faculty Governance Administrative Assistant (Clarence Greene, ext. 5719) by **5 PM on May 3, 2010**. If no objections are registered, the proposals will stand approved.

BINF 2-17-10 Establishment of BINF 6010 and 8010, “Topics in Bioinformatics”

Proposed Catalog Copy

BINF 6010. Topics in Bioinformatics (3).
Prerequisite: permission of department. Topics in bioinformatics and genomics selected to supplement the regular course offerings. A student may register for multiple sections of the course with different topics in the same semester or in different semesters. (On demand)

BINF 8010*. Topics in Bioinformatics (3).
Prerequisite: permission of department. Topics in bioinformatics and genomics selected to supplement the regular course offerings. A student may register for multiple sections of the course with different topics in the same semester or in different semesters. (On demand)

BINF 3-10-10 Establishment of a new Ph.D. program in Bioinformatics and Computational Biology

Department of Bioinformatics & Genomics

Ph.D. in Bioinformatics and Computational Biology

Department of Bioinformatics and Genomics

365 Bioinformatics Building
704-687-8541
bioinformatics.uncc.edu

Chair

Dr. Lawrence Mays

Graduate Faculty

Xiuxia Du, Assistant Professor
Anthony Fodor, Assistant Professor
Cynthia Gibas, Associate Professor
Jun-tao Guo, Assistant Professor
Dennis Livesay, Associate Professor
Ann Loraine, Associate Professor
Jessica Schlueter, Assistant Professor
Shannon Schlueter, Assistant Professor
Susan Sell, Professor
Zhengchang Su, Assistant Professor
Jennifer Weller, Associate Professor

PH.D. IN BIOINFORMATICS AND COMPUTATIONAL BIOLOGY

The Department of Bioinformatics and Genomics admits students seeking the Ph.D. degree in Bioinformatics and Computational Biology.

Ph.D. in Bioinformatics and Computational Biology Requirements

Students will be required to demonstrate competence in the areas of biochemistry, cellular and molecular biology, genetics, statistics, and computer science related to core concepts in bioinformatics. The student's advisor and at least one other dissertation committee member must be faculty in the Bioinformatics track. Students must complete at least 72 post-baccalaureate credit hours. This includes at least 18 hours of dissertation research and at least 9 hours of course work completed at UNC Charlotte. Students are expected to acquire a sufficiently broad body of technical knowledge in the discipline as well as a deep understanding of a specialized area. This is accomplished with a combination of required courses and appropriate electives approved by the student's advisor(s) and dissertation committee.

Course Requirements

Plans of Study for Bioinformatics Ph.D. students are developed on an individual basis, by the student and his or her advisory committee. The required coursework is organized in three tiers of formal training: Gateway courses, Core courses, and Electives. The Gateway courses will differ according to the student's background. A student with a strong computer science background would likely take BINF 8100 and BINF 8101, but not BINF 8111 and BINF 8112. A student with a strong background in the life sciences would take BINF 8111 and BINF 8112, but not BINF 8100 and BINF 8101. This determination is made by Program Director when the student enters the Program. All students, regardless of their background, must take the Core courses, BINF 8200, BINF 8201, and BINF 8202 and nine credit hours of Electives. Students may register for Elective courses, or for courses outside of the Bioinformatics and Genomics Department with the permission of the Program Director.

Gateway Courses:

- BINF 8100 Biological Basis of Bioinformatics
- BINF 8101 Energy and Interaction in Biological Modeling
- BINF 8111 Bioinformatics Programming I
- BINF 8112 Bioinformatics Programming II

Core Courses:

- BINF 8200 Statistics for Bioinformatics
- BINF 8201 Molecular Sequence Analysis
- BINF 8202 Computational Structural Biology

Elective Courses:

- BINF 8203 Genomics
- BINF 8204 Mathematical Systems Biology
- BINF 8205 Computational Molecular Evolution
- BINF 8210 Numerical Methods and Machine Learning in Bioinformatics
- BINF 8211 Design and Implementation of Biological Databases
- BINF 8311 Biophysical Modeling
- BINF 8312 Computational Comparative Genomics
- BINF 8313 Structure, Function, and Modeling of Nucleic Acids
- BINF 8601 Journal Club
- BINF 8151 Professional Communications
- BINF 8171 Business of Biotechnology
- BINF 8310 Advanced Statistics for Genomics
- BINF 8350 Biotechnology and Genomics Laboratory
- BINF 8380 Bioinformatics Programming III

Research Rotations

Each Ph.D. student must complete two research rotations, BINF 8911, and 8912, in their first year. These rotations provide two semesters of faculty supervised research experience to supplement regular course offerings. The purpose of these courses is to broaden students' exposure to state-of-the-art technologies currently being utilized within the field of bioinformatics, to guide them towards recognizing important, outstanding questions in specific scientific domains, and to give them hands-on training within those domains. Students select their rotation projects in consultation with the Program Director and selected faculty members. At the end of each rotation, students must prepare a formal presentation on their findings for the faculty and their peers.

- BINF 8911 Research Rotation I
- BINF 8912 Research Rotation II

Seminar

BINF 8600 is taken every semester until advancing to Ph.D. candidacy. The Bioinformatics Seminar has been required of the current IT Bioinformatics track Ph.D. students and Bioinformatics Professional Science Master's students and will continue to be a part of the BCB Ph.D. program. During the fall and spring semesters, the seminar hosts guest speakers to present talks that focus on bioinformatics, genomics, and computational biology related research. There are also designated seminar slots for the Ph.D. students to present their research rotation work.

- BINF 8600 Graduate Research Seminar

Qualifying Examination

Students are required to take a qualifying exam to demonstrate proficiency in the fundamentals of bioinformatics and computational biology, as well as competence in statistics, molecular biology, biochemistry, and genetics. The qualifying exam must be passed prior to 5th semester of residence. The qualifying exam for the Bioinformatics and Computational Biology Ph.D. is composed of both a written and oral examination. The qualifying exam committee will have the same members in any given semester. The written component will have three sections that emphasize (a.) molecular sequence analysis, (b.) computational structural bioinformatics, and (c.) statistics and research methods. The qualifying exam is based largely on material covered in the Core courses listed above. The written sections are graded numerically, and the examinations and grades are kept by the Program to assess student outcomes. Each student must pass all sections in order to advance; failure to pass requires that the student attempt the failed sections the following semester. Passed sections carry forward from one exam to the next. Two attempts are permitted. After passing the three written sections, students must pass an oral exam over the same and related topics, for which three attempts are also permitted. Students who do not pass both sections of the qualifying exam will be dismissed from the program.

Research

Students become engaged in research immediately upon entering the Program through two mandatory research rotations in the first year. A student is expected to identify a research mentor by the beginning of the second year, and take pre-dissertation research credits. Once the qualifying examination is passed (i.e., by the 5th semester), the student should have formed a dissertation committee in consultation with the mentor and the Program Director. UNC Charlotte Graduate School rules specify that the committee consist of at least five members, four of whom must be BCB faculty members (Core or Participating) and one appointed by the Graduate School. The committee chair must be a BCB faculty member. Dissertation committee meetings are held once a semester starting in the fall semester of the third year to ensure sufficient progress is being made to complete the dissertation within five years. Students are required to present an oral progress report at each meeting, followed by a discussion of goals for the following semester.

Teaching and Professional Development

Students are required to serve as teaching assistants for at least one Bioinformatics and Computational Biology course after they have passed their qualifying exam. Faculty members supervising teaching assistants will specify their duties, which may include: attending classes, assisting with grading, preparing and delivering lectures, and/or proctoring exams. The Professional Communications course is highly recommended but not required. This course will be useful for Ph.D. students with their oral presentations, poster presentations, scientific writing, use of references and avoiding plagiarism. Students will also learn how to properly organize and a run a meeting. Lastly, students will prepare a CV, job application letter with supporting documents, and job talk.

Dissertation Proposal, Oral Defense, and Publication(s)

Each student must present and defend a Ph.D. dissertation proposal no more than three semesters after passing the qualifying exam. The proposal defense will be conducted by the student's Dissertation Committee and will be open to faculty and students. At the discretion of the Dissertation Committee, the defense may include questions that cover the student's program of study and background knowledge in the area of the proposal. A student can retake the proposal defense if he/she does not pass it the first time. The second failed defense of a dissertation proposal will result in the termination of the student's enrollment in the Ph.D. program. A doctoral student advances to Ph.D. candidacy after the dissertation proposal has been successfully defended. Each student must complete a research program approved by the student's Dissertation Advisor(s) that yields a high quality, original and substantial piece of research. The Ph.D. dissertation describes this research and its results. The dissertation defense is a public presentation. A written copy of the dissertation must be made available to each member of the student Ph.D. Dissertation Committee, to the Program Director, and to the UNC Charlotte Library at least three weeks before the public defense. The date of the defense must be publicly announced at least three weeks prior to the defense. The student must present the dissertation and defend it in a manner accepted by the Dissertation Committee. The dissertation will be graded as pass/fail by the Dissertation Committee and must be approved by the Dean of the Graduate School. A student who fails the defense of a dissertation twice will be terminated from the Ph.D. program.

COURSES IN BIOINFORMATICS

BINF 8100. Biological Basis of Bioinformatics. (3)
Prerequisites: Admission to graduate standing in Bioinformatics and undergraduate training in Computer Science or other non-biological discipline. This course provides a foundation in molecular genetics and cell biology focusing on foundation topics for graduate training in bioinformatics and genomics. (Fall)

BINF 8101. Energy and Interaction in Biological Modeling. (3)
Prerequisites: Admission to graduate standing in Bioinformatics. This course covers: (i.) the major organic and inorganic chemical features of biological macromolecules; (ii.) the physical forces that shape biological molecules, assemblies and cells; (iii.) the chemical driving forces that govern living systems; (iv.) the molecular roles of biological macromolecules and common metabolites; (v.) and the pathways of energy generation and storage. Each section of the course builds upon the relevant principles in biology and chemistry to explain the most common mathematical and physical abstractions used in modeling in the relevant context. (Spring)

BINF 8111. Bioinformatics Programming I. (3)
Prerequisite: Admission to graduate standing in Bioinformatics. This course introduces fundamentals of programming for bioinformatics using a high-level object-oriented language such as python. The first weeks cover core data types, syntax, and functional programming, focusing on construction of programs from small, testable parts. Students will learn productive use of the Unix environment, focusing on Unix utilities that are particularly useful in bioinformatics. The course will cover object-oriented programming, introduce analysis of algorithms and sequence alignment methods, and introduce computational environments that are particularly useful in bioinformatics analyses such as R, BioPython, and Web services in bioinformatics. By the end of the class, students will have gained the ability to analyze data within the python interpreter (for example) and write well-documented, well-organized programs. (Fall)

BINF 8112. Bioinformatics Programming II. (3)
Prerequisite: BINF 8111*/ITSC 8111. This is a continuation of Bioinformatics Programming I (BINF 8111). This course is the second semester of Introduction to Bioinformatics Programming I. In this semester, students will practice and refine skills learned in the first semester. New topics introduced will include: programming as part of a team, using sequence analysis algorithms in realistic settings; writing maintainable and re-usable code; Web programming; and graphical user interface development. At the end of the semester, students will be able to evaluate and deploy computer languages, tools, and software engineering techniques in bioinformatics research. (Spring)

BINF 8151/GRAD 8151. Professional Communications. (1) This course covers: Principles and useful techniques for effective oral presentations, poster presentations, scientific writing, use of references and avoiding plagiarism. Students in the class will critique and help revise each other's presentations and learn how to avoid common pitfalls. In addition, students will learn how to properly organize and run a meeting. Students will prepare a CV, job application letter and job talk. (Fall).

BINF 8171. **Business of Biotechnology. (3)** This course introduces students to the field of biotechnology and how biotech businesses are created and managed. The students should be able to define biotechnology and understand the difference between a biotech company and a pharmaceutical company. Additional concepts covered will include platform technology, biotechnology's history, biotechnology products and development processes, current technologies used by biotech companies today, biotechnology business fundamentals, research and development within biotech companies, exit strategies, and careers in the biotech field. (Summer)

BINF 8200. Statistics for Bioinformatics. (3)
This course aims to introduce statistical methods commonly used in bioinformatics. Basic concepts from probability, stochastic processes, information theory, and other statistical methods will be introduced and illustrated by examples from molecular biology, genomics and population genetics with an outline of algorithms and software. R is introduced as the programming language for homework. (Fall)

BINF 8201. Molecular Sequence Analysis. (3)
Prerequisite: BINF 8100*/ITSC 8100 or equivalent. BINF 8100 or equivalent. Introduction to bioinformatics methods that apply to molecular sequence. Intro to biological databases online. Sequence databases, molecular sequence data formats, sequence data preparation and database submission. Local and global sequence alignment, multiple alignment, alignment scoring and alignment algorithms for protein and nucleic acids, gene finding and feature finding in sequence, models of molecular evolution, phylogenetic analysis, comparative modeling. (Fall)

BINF 8202. Computational Structural Biology. (3)
Prerequisite: BINF 8101*, 8201*/ITSC 8101, 8201 or equivalents. This course covers: **(a)** the fundamental concepts of structural biology (chemical building blocks, structure, superstructure, folding, etc.); **(b)** structural databases and software for structure visualization; **(c)** structure determination and quality assessment; **(d)** protein structure comparison and the hierarchical nature of biomacromolecular structure classification; **(e)** protein structure prediction and assessment; and **(f)** sequence- and structure-based functional site prediction. *(Fall)*

BINF 8203. Genomics. (3)
Prerequisite: BINF 8100*/ITSC 8100 or equivalent. This course surveys the application of high-throughput molecular biology and analytical biochemistry methods and data interpretation for those kinds of high volume biological data most commonly encountered by bioinformaticians. The relationship between significant biological questions, modern genomics technology methods, and the bioinformatics solutions that enable interpretation of complex data is emphasized. Topics include: Genome sequencing and assembly, annotation, and comparison. Genome evolution and individual variation. Function prediction. Gene ontologies. Transcription assay design, data acquisition, and data analysis. Proteomics methods. Methods for identification of molecular interactions. Metabolic databases, pathways and models. (Spring)

BINF 8204. Mathematical Systems Biology. (3)
Prerequisites: BINF 8200* and 8210*/ITSC 8200 AND 8210 or equivalents. This course introduces basic concepts, principles and common methods used in systems biology. The class emphasizes on molecular networks, models and applications, and covers the following topics: the structure of molecular networks; network motifs, their system properties and the roles they play in biological processes; complexity and robustness of molecular networks; hierarchy and modularity of molecular interaction networks; kinetic proofreading; optimal gene circuit design; the rules for gene regulation. (Spring)

BINF 8205. Computational Molecular Evolution. (3)
Pre-requisites: BINF 8201*/ITSC 8201 (Molecular Sequence Analysis) and BINF 8200*/ITSC 8200 Statistics for Bioinformatics (or permission of the instructor). This course will cover major aspects of molecular evolution and phylogenetics with an emphasis on the modeling and computational aspects of the fields. Topics will include: models of nucleotide substitution, models of amino acid and codon substitution, phylogenetic reconstruction, maximum likelihood methods, Bayesian methods, comparison of phylogenetic methods and tests on trees, neutral and adaptive evolution and simulating molecular evolution. Students will obtain an in-depth knowledge of the various models of evolutionary processes, a conceptual understanding of the methods associated with phylogenetic reconstruction and testing of those methods and develop an ability to take a data-set and address fundamental questions with respect to genome evolution. (On demand)

BINF 8210. Numerical Methods and Machine Learning in Bioinformatics. (3)
Prerequisites: Ability to program in a high-level language (Perl, Java, C#, Python, Ruby, C/C++), Calculus. This course focuses on commonly used numerical methods and machine learning techniques. Topics will include: solutions to linear systems, curve fitting, numerical differentiation and integration, PCA, SVD, ICA, SVM, PLS. Time permitting, hidden markov chains and Monte Carlo simulations will be covered as well. Students will learn both the underlying theory and how to apply the theory to solve problems. *(Fall)*

BINF 8211. Design and Implementation of Bioinformatics Databases. (3)
In this course students will acquire skills needed to access and utilize public biomedical data repositories, and will be expected to design, instantiate, populate, query and maintain a personal database to support research in an assigned domain of bioinformatics. The course content includes common data models and representation styles, use of open-source relational DBMS, and basic and advanced SQL. The course focuses on how data integration is achieved, including the use of standardized schemas, exchange formats and ontologies. We will examine large public biomedical data repositories such as GenBank and PDB, learn how to locate and assess the quality of data in Web-accessible databases, and look at representation, standards and access methods for such databases. *(Spring)*

BINF 8310. Advanced Statistics for Genomics. (3)
Prerequisite: BINF 8200*/ITSC 8200 or equivalent. The first half of this course emphasizes canonical linear statistics (t-test, ANOVA, PCA) and their non-parametric equivalents. The second half of the course emphasized Bayesian statistics and the application of Hidden Markov Models to problems in bioinformatics. Students should have fluency in a high-level programming language (PERL, Java, C# or equivalent) and will be expected in assignments to manipulate and analyze large public data sets. The course will utilize the R statistical package with the bioconductor extension. *(Spring)*

BINF 8311. Biophysical Modeling. (3)
This course covers: **(a)** an overview of mechanical force fields; **(b)** energy minimization; **(c)** dynamics simulations (molecular and coarse-grained); **(d)** Monte-Carlo methods; **(e)** systematic conformational analysis (grid searches); **(f)** classical representations of electrostatics (Poisson-Boltzmann, Generalized Born and Coulombic); **(g)** free energy decomposition schemes; and **(h)** hybrid quantum/classical (QM/MM) methods. *(On demand)*

BINF 8312. Computational Comparative Genomics. (3)
Prerequisite: BINF 8201*/ITSC 8201 or equivalent. This course introduces computational methods for comparative genomics analyses. The course covers the following topics: the architecture of prokaryotic and eukaryotic genomes; the evolutionary concept in genomics; databases and resources for comparative genomics; principles and methods for sequence analysis; evolution of genomes; comparative gene function annotation; evolution of the central metabolic pathways and regulatory networks; genomes and the protein universe; *cis*-regulatory binding site prediction; operon and regulon predictions in prokaryotes; regulatory network mapping and prediction. *(On demand)*

BINF 8313. Structure, Function, and Modeling of Nucleic Acids. (3)
Prerequisite: BINF 8100-8101 or equivalent. The course covers the following topics: atomic structure, macromolecular structure-forming tendencies and dynamics of nucleic acids; identification of genes which code for functional nucleic acid molecules, cellular roles and metabolism of nucleic acids; 2D and 3D abstractions of nucleic acid macromolecules and methods for structural modeling and prediction; modeling of hybridization kinetics and equilibria; hybridization-based molecular biology protocols, detection methods and molecular genetic methods, and the role of modeling in designing these experiments and predicting their outcome. *(On demand)*

BINF 8350. Biotechnology and Genomics Laboratory. (3) Prerequisite: none. This course teaches basic wet-lab techniques commonly used in biotechnology to generate genomics data. Lectures will cover methods for sample isolation, cell disruption, nucleic acid and protein purification, nucleic acid amplification, protein isolation and characterization, molecular labeling methods and commonly used platforms for characterizing genome-wide molecular profiles. In particular we will discuss and learn to perform: tissue culture and LCM isolation of cells, DNA sequencing methods, DNA fingerprinting methods, RT-qPCR and microarrays of cDNA, 1D and 2D gels for protein separation, protein activity assays, and proteomics platforms. Lectures will describe emerging methodologies and platforms, and will discuss the ways in which the wet-lab techniques inform the design and use of bioinformatics tools, and how the tools carry out the processing and filtering that leads to reliable data. The course will also discuss the commercial products beginning to emerge from genomics platforms. (Spring)

BINF 8380. Programming III. (3)
Prerequisite: BINF 8112 or equivalent. This course emphasizes implementation of bioinformatics algorithms in the context of parallel processing. Topics covered depend on instructor expertise and student interest but may include development of multi-threaded applications, developing for multi-core processors and utilization of large clusters and “cloud” supercomputers. Students will be expected to complete a significant independent project (Fall).

BINF 8600. Seminar. (1)
Prerequisites: Admission to graduate standing in Bioinformatics. Departmental seminar. Weekly seminars will be given by bioinformatics researchers from within the university and across the world. *(Fall, Spring)*

BINF 8601. Journal Club. (1)
Prerequisites: Admission to graduate standing in Bioinformatics. Each week, a student in the class is assigned to choose and present a paper from the primary bioinformatics literature. *(Fall, Spring)*

BINF 8911 Research Rotation I (2), BINF 8912 Research Rotation II (2).
Faculty supervised research experience in bioinformatics to supplement regular course offerings.

BINF 3-11-10 Establishment of a new Bioinformatics Technology Graduate Certificate Program

Graduate Certificate Program in Bioinformatics Technology

The purpose of the Graduate Certificate in Bioinformatics Technology is to train individuals in method development for analysis of large-scale biological data and modeling of complex biological systems, with a focus on acquiring complementary skill sets in life sciences and in programming, statistical analysis, and database development. The certificate requires fifteen (15) credit hours of coursework. The certificate may be pursued concurrently with a related graduate degree program at UNC Charlotte.

Admission Requirements
For admission into the certificate program, applicants must meet the following requirements:

1. A bachelor's degree in related field, including, but not limited to, a life science, physical science, mathematics, or computing discipline.
2. Practical experience and confidence with computers, for instance use of common web browsers, word processing, plotting, and spreadsheet applications.

Program Requirements
Students will follow one of two pathways through the program, depending on their bachelor's degree field and previous experience. The following courses make up the required core:

If the bachelor's degree is in life sciences:

BINF - 6200 Statistics for Bioinformatics (3)
BINF - 6110 Bioinformatics Programming I (3)
BINF - 6111 Bioinformatics Programming II (3)

If the bachelor's degree is in computing or mathematics:

BINF - 6200 Statistics for Bioinformatics (3)
BINF - 6100 Biological Basis of Bioinformatics (3)
BINF - 6101 Energy and Information in Biological Modeling (3)

One advanced bioinformatics technology course from the following list of electives is required:

BINF - 6211 Design and Implementation of Bioinformatics Databases (3)
BINF - 6310 Advanced Statistics for Bioinformatics (3)
BINF - 6380 Bioinformatics Programming III (3)

One bioinformatics applications course from the following list of electives is required:

BINF 6201 - Molecular Sequence Analysis (3)
BINF 6202 - Computational Structural Biology (3)
BINF 6203 - Genomics (3)

If a student wishes to enter the program having completed coursework that is equivalent to the core course requirements, the core requirements may be waived at the discretion of the certificate coordinator. In this case, the required 15 coursework hours may be selected from the electives listed above, or from other advanced graduate courses offered by the Department of Bioinformatics and Genomics.

Transfer credit may not be applied toward this certificate.

It is suggested that students in the Graduate Certificate Program arrange formal co-mentorship by a Department of Bioinformatics and Genomics faculty member, if the student is concurrently enrolled in another thesis-based degree program on campus and intends to extend or enable their thesis research through the application of bioinformatic methods.

BINF 3-12-10 Establishment of a new Bioinformatics Applications Graduate Certificate Program

Graduate Certificate Program in Bioinformatics Applications

The purpose of the Graduate Certificate in Bioinformatics Applications is to train individuals in the application of established bioinformatics methods for analysis of biological sequence, structure, and genomic data. The certificate requires twelve (12) credit hours of coursework. The certificate may be pursued concurrently with a related graduate degree program at UNC Charlotte or as a standalone program.

Admission Requirements

For admission into the certificate program, applicants must meet the following requirements:

1. A bachelor's degree in a life science discipline, that includes advanced coursework in molecular biology and genetics.
2. Practical experience and confidence with computers, for instance use of common web browsers, word processing, plotting, and spreadsheet applications.

Program Requirements

Students will take four courses that introduce core methods for analysis of molecular biological data:

BINF - 6200 Statistics for Bioinformatics (3)

And three courses chosen from the following list of electives:

BINF - 6201 Molecular Sequence Analysis (3)
BINF - 6202 Computational Structural Biology (3)
BINF - 6203 Genomics (3)
BINF - 6211 Design and Implementation of Bioinformatics Databases (3)
BINF - 6350 Genomic Biotechnology (3)

If a student wishes to enter the program having completed coursework that is equivalent to one or more of the core requirements, the requirements may be waived at the discretion of the certificate coordinator. In this case, the required 12 credit hours may be selected from other advanced graduate courses offered by the Department of Bioinformatics and Genomics.

Transfer credit may not be applied toward this certificate.

It is suggested that students in the Graduate Certificate Program arrange formal co-mentorship by a Department of Bioinformatics and Genomics faculty member, if the student is concurrently enrolled in another thesis-based degree program on campus and intends to extend or enable their thesis research through the application of bioinformatic methods.

GRAD 3-12-10 Establishment of GRAD 8990, “Academic Integrity Training”

PROPOSED CATALOG COPY:

GRAD 8990. Academic Integrity (No Credit, Non-Graded).
On-line training addressing issues of academic integrity and the University’s policy and procedure related to violations. Required of all new doctoral students. (Fall, Spring)

MGMT 2-5-10 Establishment MBAD 6166, “Ethics and Global Capitalism”

PROPOSED CATALOG COPY:

MBAD 6166. Ethics and Global Capitalism (3).
Prerequisites: all Belk College of Business graduate students or permission of the MBA director. Study of ethical arguments supporting and critical of capitalist economic and social systems in relation to business strategy and public policy. Topics to be addressed may include property rights, justice, desert, equality, and sustainable capitalism. (Every other year)

MUSC 2-15-10 Establishment of a new Graduate Certificate Program in Violin

PROPOSED CATALOG COPY:

Program Description:
The Graduate Certificate in Violin is designed to provide students with intensive training in performance, pedagogy, and repertoire beyond the undergraduate level. The curriculum consists of 15 hours of graduate-level work that can be completed over the course of one academic year, including two semesters of ensembles and sectionals, two semesters for private lessons and masterclasses, and courses in music theory, pedagogy, and repertoire.

Admissions Requirements:

a. A bachelor’s degree in music from an accredited university or conservatory.
b. Online application to Graduate Admissions, accompanied by the application fee in effect.
c. GPA required for entry into a master’s degree program.
d. Official transcripts.
e. A formal audition for acceptance as a post-baccalaureate student.
f. Placement tests may be remedied through coursework at UNC Charlotte or any other accredited institution.

Program Requirements:

MUSC 5049	Violin Literature. (3)
MUSC 5149	Violin Pedagogy. (3)
MUSC 5230	Form and Analysis. (3)
MUPF 6160	Chamber Orchestra. (1). Two semesters
MUPF 6160L	Chamber Orchestra Sectionals. (0). Two semesters
MUPF 6249	Applied Music: Violin. (2). Two semesters
MUPF 6249L	Violin Masterclass (0). Two semesters