APPROVED BY SENATE
09/21/2020

EP.21.004
Approved by EP 09/14/2020

10KS5098MS: BIOINFORMATICS: INFORMATION SCIENCES, MS

In Workflow

1. U Program Review (dforgacs@illinois.edu; eastuby@illinois.edu; aledward@illinois.edu)
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Approval Path

1. Wed, 06 May 2020 15:47:39 GMT
   Deb Forgacs (dforgacs): Approved for U Program Review
2. Wed, 06 May 2020 15:56:16 GMT
   Emily Knox (knox): Approved for 1992 Head
3. Wed, 06 May 2020 16:25:02 GMT
   Karin Readel (kereadel): Approved for 1468 Head
4. Wed, 06 May 2020 16:35:34 GMT
   Kathy Martensen (kmartens): Approved for LM Dean
5. Wed, 06 May 2020 16:36:27 GMT
   Emily Knox (knox): Approved for LP Dean
6. Wed, 06 May 2020 16:55:11 GMT
   John Wilkin (jpwilkin): Approved for University Librarian
7. Wed, 03 Jun 2020 20:26:46 GMT
   Allison McKinney (agrindly): Approved for Grad_College
8. Tue, 11 Aug 2020 15:39:01 GMT
   Kathy Martensen (kmartens): Approved for Provost

History

1. Sep 9, 2019 by Mary Lowry (lowry)
2. Sep 9, 2019 by Mary Lowry (lowry)

Date Submitted:Wed, 08 Apr 2020 13:29:05 GMT

Viewing:10KS5098MS : Bioinformatics: Information Sciences, MS

Changes proposed by: Dustin Janes

Proposal Type

Proposal Type:

Concentration (ex. Dietetics)

This proposal is for a:

Revision

Proposal Title:

If this proposal is one piece of a multi-element change please include the other impacted programs here.*example: A BS revision with multiple concentration revisions*

Rename and Revise the Library and Information Sciences concentration in the MS in Bioinformatics.

EP Control Number

EP.21.004

Official Program Name

Bioinformatics: Information Sciences, MS

Effective Catalog Term

Fall 2020

Sponsor College

School of Information Sciences

Sponsor Department

Information Sciences

Sponsor Name

Emily Knox

Sponsor Email

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Program Description and Justification

Justification for proposal change:

Renaming: changing the name of the concentration from "Graduate School of Library and Information Science Concentration" to "Information Sciences Concentration"
Justification: alignment with the School name change to "School of Information Sciences"

Curriculum: revising the fields of the curriculum to more accurately represent the areas of study in the concentration
Justification: incorporating fields that were not originally sought at conception of this concentration; such as medical informatics, data mining, and data analysis. The establishment and growth of complementary programs within the school, particularly the MS in Information Management, provides an opportunity to indicate the increased depth and breadth of the information sciences curriculum relevant to bioinformatics.

Is this program interdisciplinary?

Yes

Interdisciplinary Colleges and Departments (list other colleges/departments which are involved other than the sponsor chose above)

College

Information Science, School of

Department

Information Sciences

Do you need to add an additional interdisciplinary relationship?

No

Corresponding Program(s):

Corresponding Program(s)
Bioinformatics, MS

Academic Level

Graduate

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

Unchanged

Delivery Method

Is this program available on campus and online?

No

This program is available:

On Campus

Budget

Are there budgetary implications for this revision?

No

Will the program or revision require staffing (faculty, advisors, etc.) beyond what is currently available?

No

Resource Implications

Facilities

Will the program require new or additional facilities or significant improvements to already existing facilities?

No

Technology

Will the program need additional technology beyond what is currently available for the unit?

No

Non-Technical Resources

Will the program require additional supplies, services or equipment (non-technical)?

No

Resources

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc. Describe how the unit will support student advising, including job placement and/or admission to advanced studies.

Unchanged

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

Unchanged

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

Does this new program/proposed change result in the replacement of another program?

No

Does the program include other courses/subjects impacted by the creation/revision of this program?

Yes

Required courses

ANSC 542 - Applied Bioinformatics
ANSC 545 - Statistical Genomics
CHBE 571 - Bioinformatics
CPSC 567 - Bioinformatics & Systems Biol
CS 466 - Introduction to Bioinformatics
IB 467 - Principles of Systematics
MCB 432 - Computing in Molecular Biology
CS 411 - Database Systems
CS 466 - Introduction to Bioinformatics
CS 473 - Algorithms
CPSC 565 - Perl & UNIX for Bioinformatics
STAT 428 - Statistical Computing
STAT 440 - Statistical Data Management
STAT 448 - Advanced Data Analysis
STAT 480 - Data Science Foundations
STAT 525 - Computational Statistics
ANSC 441 - Human Genetics

ANSC 444 - Applied Animal Genetics
ANSC 446 - Population Genetics
BIOP 401 - Introduction to Biophysics
BIOP 550 - Biomolecular Physics
CPSC 452 - Advanced Plant Genetics
CPSC 466 - Genomics for Plant Improvement
CPSC 563 - Chromosomes
CPSC 564 - Molecular Marker Data Analyses
CPSC 566 - Plant Gene Regulation
MCB 400 - Cancer Cell Biology
MCB 501 - Advanced Biochemistry

Explain how the inclusion or removal of the courses/subjects listed above impacts the offering departments.

These are the courses outside of the iSchool listed in the program.

Financial Resources

How does the unit intend to financially support this proposal?

Unchanged

Will the unit need to seek campus or other external resources?

No

Is this program requesting self-supporting status?

No

Program Regulation and Assessment

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

“Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses” (source: https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf). For proposals for new bachelor’s degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

Revised programs

Bioinformatics Revision 8-26.docx

Attach a side-by-side comparison with the existing program AND, if the revision references or adds "chose-from" lists of courses students can select from to fulfill requirements, a listing of these courses, including the course rubric, number, title, and number of credit hours.

Catalog Page Text

Statement for Programs of Study Catalog

Code	Title	Hours
Choose One (1) course from each of the following areas:		
Data Stewardship		
IS 455	Database Design and Prototyping	
IS 515	Information Modeling	
IS 537	Theory & Practice of Data Cleaning	
IS 543	Digital Preservation	
IS 547	Foundations of Data Curation	
IS 575	Metadata in Theory & Practice	
Data Analytics		
IS 407	Introduction to Data Science	
IS 445	Data Visualization	
IS 507	Data, Statistical Models and Information	
IS 527	Network Analysis	
IS 557	Applied Machine Learning: Team Projects	
IS 567	Text Mining	
IS 577	Data Mining	
System Policy & Design		
IS 419	Entrepreneurial Information Technology Design	
IS 445	Data Visualization	
IS 504	Sociotechnical Information Systems	
IS 584	Advanced Topics in Ethics and Privacy (Privacy in the Internet Age)	
IS 586	Usability Engineering	
IS 594	Advanced Topics in Management and Policy (Information Policy)	
Electives		12
IS 424	Social Computing	
IS 464	Information Assurance	
IS 517	Methods of Data Science	
IS 571	Advanced Topics in Use and Users of Information (Info Services for Diverse Users)	
INFO 591	Grad Bioinformatics Seminar	
For Thesis Option up to 8 hours:		
IS 599	Thesis Research	
Total Hours		36

Other Requirements

Code	Title	Hours
Other requirements may overlap		
A concentration is required.		
Minimum 500-level Hours Required Overall:		12
Minimum GPA:		3.0

EP Documentation

DMI Documentation

Banner/Codebook Name

MS: Bioinformatics: LIS - UIUC

Program Code:

10KS5098MS

Conc Code

5098

Degree Code

MS

Major Code

4026

Program Reviewer Comments

Dustin Janes (djanes3) (Fri, 24 Jan 2020 15:41:17 GMT): Rollback: Add Machine Learning course to Data Analytics options.
Karin Readel (kereadel) (Wed, 06 May 2020 16:23:35 GMT): In appendix B of the "side by side" document, the URL for the campus wide Bioinformatics site (where core courses are listed) is wrong. It should be https://www.informatics.illinois.edu/bioinformatics-masters/

Key: 876

Appendix A:
Proposed Curriculum Revisions

Current Requirements:	Current Hours	Revised Requirements:	Revised Hours
Campus Common Core Requirement		***Campus Common Core Requirement***	
Biology Core	4 Hours	Biology Core	4 Hours
Computer Science Core	4 Hours	Computer Science Core	4 Hours
Fundamental Bioinformatics Core	4 Hours	Fundamental Bioinformatics Core	4 Hours
Concentration Core Requirements (choice of 3 in these 4 areas)		***Concentration Core Requirement***	
Information Organization and Knowledge Representation	4 Hours	Data Stewardship	4 Hours
Information Resources, Uses and Users	4 Hours	Data Analysis	4 Hours
Information Systems and Access	4 Hours	System Policy and Design	4 Hours
Disciplinary Focus	4 Hours		
Total Core Requirements	24 hours	***Total Core Requirements***	24 hours
Electives	12 hours	***Electives***	12 hours
Total Hours	36 hours	***Total Hours***	36 hours

Appendix B:
Current Concentration Core Requirements

CORE REQUIREMENTS

To satisfy the campus core requirements, one (1) course must be taken from each of the three (3) Core Areas: Biology, Computer Science, and Fundamental Bioinformatics. The courses approved for the core in the Biology, Computer Science, and Bioinformatics areas are listed on the **campus-wide MS in Bioinformatics site**. Additionally, the iSchool requires one (1) four-hour course in three of the following four (4) areas:

Information Organization and Knowledge Representation

LIS 561 Information Modeling
LIS 590II Interfaces to Information Systems
LIS 590I Indexing and Abstracting
LIS 590DM Document Modeling
LIS 590OD Ontology Development
LIS 590ON Ontologies in Natural Science
LIS 590RO Representing and Organizing Information Resources

Information Resources, Uses and Users

LIS 503 Use and Users of Information
LIS 522 Information Sources in the Sciences
LIS 530I Biological Informatics Problems and Resources
LIS 590TR Information Transfer and Collaboration in Science

Information Systems and Access

LIS 453 Systems Analysis and Management
LIS 456 Information Storage and Retrieval
LIS 556 Implementation of Information Retrieval Systems
LIS 560 Digital Libraries
LIS 566 Architecture of Network Information Systems
LIS 590DP Document Processing
LIS 590EP Electronic Publishing
LIS 590LD Literature-based Discovery

Disciplinary Focus

LIS 530B Health Sciences Information Services and Resources
LIS 590HI Healthcare Informatics (Healthcare Infrastructure)
LIS 590BD Biodiversity Informatics

A typical student will thus take 6 required courses (24 hours): 1 Biology, 1 Computer Science, 1 Fundamental Bioinformatics, and 3 LIS. The student must then choose 3 courses (12 hours) of electives to complete the degree. It is strongly encouraged that up to 2 courses of these electives (8 hours) are thesis. A recommended list of electives is given above. Our expectation is that each student will arrange a custom program of study, suitable for the information management of their particular bioinformatics application.

A student who has already completed coursework comparable to one or more of the required courses for the MS in bioinformatics prior to enrolling in the degree program may petition to waive enrollment in that required course and replace it with a comparable number of hours of elective credit toward the MS in bioinformatics. Such a petition needs to be approved by the advisor, the iSchool associate dean, and the Graduate College. Additionally, students may request transfer of credit for graduate level coursework from any accredited institution (maximum 8 hours) that has not already been applied towards a degree.

Appendix C:
Revised Concentration Core Requirements

Students will complete 36 graduate credit hours to earn an MS in Bioinformatics from the iSchool. The MS degree is offered in both thesis and non-thesis options. To satisfy the campus core requirements, one course must be taken from each of the 3 core

areas: biology, computer science, and fundamental bioinformatics. The courses approved for these core requirements are listed on the campus-wide MS in Bioinformatics site. In addition, students completing the Information Sciences Concentration must choose 1 course from each of the following 3 areas: Data stewardship; Data analytics; and Systems policy and design. A course can meet only 1 of the requirements (i.e. the same course cannot satisfy both the iSchool and Campus level requirements. Similarly a course can only be used to satisfy one of the area requirements within the iSchool).

The student must then choose 3 courses (12 hours) of electives to complete the degree. Up to 2 courses of these electives (8 hours) can be thesis. A recommended list of electives is given below. Our expectation is that each student will arrange a custom program of study, suitable for the information management of their particular bioinformatics application.

Data Stewardship

- IS 455 Databases Design and Prototyping
- IS 531 Foundations of Data Curation
- IS 532 Theory & Practice Data Cleaning
- IS 561 Information Modeling
- IS 562 Metadata in Theory & Practice
- IS 586 Digital Preservation

Data Analytics

- IS 457 Intro to Data Science
- IS 542 Data, Stat, Info
- IS 557 Text Mining
- IS 559 Network Analysis
- IS 590DT Data Mining
- IS 590DV Data Visualization

System Policy & Design

- IS 490IT Entrepreneurial IT Design
- IS 543 Sociotechnical Info Sys
- IS 555 Usability Engineering
- IS 590DV Data Visualization
- IS 590IP Information Policy
- IS 590PV Privacy in the Internet Age

- IS 590SDP Scientific Data Policy Seminar

Electives

- IS 490GH Global Health Informatics
- IS 530I Bio Informatics Probs & Res
- IS 583 Grad Bioinformatics Seminar
- IS 590OD Ontology Development
- IS 590MD Methods for Data Sciences
- IS 590SF Social Computing
- IS 462 Information Assurance
- IS 547 Info Srvcs Diverse Populations