UNIVERSITY OF MARYLAND
OFFICE OF THE PRESIDENT

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April 25, 2025

Dr. Sanjay Rai
Secretary
Maryland Higher Education Commission
217 East Redwood Street, Suite 2100
Baltimore, MD 21202

Dear Secretary Rai:

I am writing to request approval for a new Master of Science program in Information. The proposal for the new program is attached. I am also submitting this proposal to the University System of Maryland for approval.

The proposal was endorsed by the appropriate faculty and administrative committees. I also endorse this proposal and am pleased to submit it for your approval.

Sincerely,

Darryll J. Pines
President
Glenn L. Martin Professor of Aerospace Engineering

DJP/mdc

cc: Candace Caraco, Associate Vice Chancellor
Jennifer King Rice, Senior Vice President and Provost
Keith Marzullo, Dean, College of Information

Office Use Only: PP#

Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program

Institution Submitting Proposal	University of Maryland, College Park

Each action below requires a separate proposal and cover sheet.

- (●) New Academic Program
- ( ) New Area of Concentration
- ( ) New Degree Level Approval
- ( ) New Stand-Alone Certificate
- ( ) Off Campus Program
- ( ) Substantial Change to a Degree Program
- ( ) Substantial Change to an Area of Concentration
- ( ) Substantial Change to a Certificate Program
- ( ) Cooperative Degree Program
- ( ) Offer Program at Regional Higher Education Center

Payment Submitted: (●) Yes ( ) No

Payment Type: (●) R*STARS # JJ540910 ( ) Check # JJ540910

Payment Amount: 850

Date Submitted:

Department Proposing Program	College of Information	
Degree Level and Degree Type	Master's; Master of Science	
Title of Proposed Program	Information	
Total Number of Credits	30	
Suggested Codes	HEGIS: 160102.00	CIP: 11.0401
Program Modality	(●) On-campus ( ) Distance Education (fully online) ( ) Both	
Program Resources	(●) Using Existing Resources ( ) Requiring New Resources	
Projected Implementation Date (must be 60 days from proposal submisison as per COMAR 13B.02.03.03)	(●) Fall ( ) Spring ( ) Summer	Year: 2025
Provide Link to Most Recent Academic Catalog	URL: https://academiccatalog.umd.edu/	
Preferred Contact for this Proposal	Name: Michael Colson	
	Title: Senior Coordinator for Academic Programs	
	Phone: (301) 405-5626	
	Email: mcolson@umd.edu	
President/Chief Executive	Type Name: Darryll J. Pines	
	Signature: Darryll J. Pines	Date: 04/25/2025
	Date of Approval/Endorsement by Governing Board:	

Revised 1/2021

A. Centrality to the University's Mission and Planning Priorities

Description. The University of Maryland, College Park (UMD) proposes a **Master of Science (M.S.) in Information**. This master's program will be a companion degree program to UMD's existing Ph.D. in Information Studies and will only be available to students in the Information Studies Ph.D. program. This master's program will primarily be an exit option for doctoral students who are not able to complete the doctoral program. This degree may also, on a request-only basis, be awarded to doctoral students in good academic standing who desire to receive additional credentialing.

The M.S. curriculum will overlap with the Ph.D. coursework. Like the Ph.D. program, the M.S. in Information is grounded in the core values of information studies, including justice, inclusion, and access. Students gain expertise in research methodology and design, interdisciplinary theory, a comprehensive understanding of prior research in their field, and the ability to synthesize and apply this knowledge effectively. Additionally, they learn to create and disseminate original research. The program offers opportunities to focus on diverse areas of information science research, such as online communities, information systems, information policy, human-computer interaction, and digital cultural heritage.

Relation to Strategic Goals. As written in the University of Maryland's Mission Statement, one of the university's goals for graduate education is to "Expand excellent professional graduate programs that are nationally recognized for their contributions to the practice of the professions, for their pioneering curricula, and for their spirit of innovation and creativity." An aspect of this mission is to provide appropriate exit pathways at various stages of a student's academic journey, equipping them with the training and credentials to move into a variety of careers. The University of Maryland Graduate School and its Graduate Council have advocated that all doctoral programs have an early exit path that will lead to a credential for students who, for any reason, cannot or choose not to complete their doctoral studies, or who wish to have the additional credential as part of their record.

Funding. No additional funding is required for this new degree offering since it is simply an early exit pathway for the existing doctoral program.

Institutional Commitment. The program will be administered by UMD's College of Information. Creation of this exit pathway for doctoral students is in alignment with the priorities of, and thus institutionally supported by, UMD's Graduate School.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan

Need. The proposed program is designed to fill a void for those enrolled doctoral students who leave the Information Studies program, which may happen for a variety of reasons. Departing students who complete the master's degree requirements will be eligible for higher-level jobs than those whose studies have terminated at the Bachelor's degree. The M.S. degree signifies

that the holder has advanced knowledge in the field of information. Please note that the name "Information," as opposed to "Information Studies" used by the Ph.D. program, will be leveraged for this M.S. program to convey not just research skill development but also the knowledge of applied and practice-centered endeavors. The *applied* facet of the M.S. program is particularly relevant for the coursework students take in the Ph.D. program pre-candidacy. Over the last decade, the College of Information has offered courses in issues such as technology and policy for digital accessibility, sociotechnical design for providing privacy, co-design of information technology for specific populations including children and older adults, protecting people from mis-and disinformation, and the ethical application of artificial intelligence and machine learning by both the private and public sectors.

State Plan. The proposed program aligns broadly with the 2022 *Maryland State Plan for Postsecondary Education*, goal of student success, specifically Priority 6, "Improve systems that prevent timely completion of an academic program." This program addresses the Action Item to "Identify and support 'Near Completer' students." Students who leave the doctoral program now leave without any credential, even if they have taken 30 or more graduate-level credits—the threshold for a Master's degree. By creating a credentialed "off-ramp" for students who enter into a doctoral program but cannot or choose not to continue through to completion, for whatever reason, UMD will provide a meaningful credential that recognizes advanced training. Their coursework will have prepared them for an array of knowledge occupations, including research positions that require expertise and experience beyond the bachelor's degree. This degree will allow the students to link their hard work with a credential that will lead to a more successful pursuit of career opportunities.

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State

This program is for Ph.D. students who will not be completing their program. As noted above, the university has been advocating for all UMD doctoral programs to have an ancillary master's program available for students who cannot finish their doctoral program, based on the belief that, all things being equal, a master's program credential is more marketable than a bachelor's program credential. It should also be noted that this program will be for a small number of students and will not be marketed to students as a master's program.

With that said, there are a variety of positions that students will be more qualified for as a result of earning their M.S. in Information. According to the U.S. Bureau of Labor Statistics (BLS), Computer and Information Research Scientists positions are projected to grow much faster than average (please note also that the BLS indicates the typical education level for this field is the master's degree).[1] Database Administrators and Architects positions are projected to

[1] BLS data on Computer and Information Research Scientists: https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm

grow much faster than average.[2] Web Developers and Digital Designers positions are projected to grow faster than average.[3] According to current Maryland Department of Labor projections (projecting increases from 2022 to 2032), these same occupations are also projected to rise in the state: Computer and Information Research Scientists (21.52%), Database Administrators (11.99%), and Web Developers (21.11%).[4]

D. Reasonableness of Program Duplication

There are many master's level programs that exist in the state with Information in the title. There are many with the CIP code 11.0401, including the following areas: Information Systems programs (UMBC, Bowie State, Johns Hopkins); Information Technology design and engineering (Capitol Technology University, UMGC, Johns Hopkins); business innovation and ecommerce (Stevenson University and Capitol Technology University); data analytics (Notre Dame University of Maryland, Loyola); and specialized applications, such as Human Centered Computing (UMBC), Geographic Information Systems (Johns Hopkins University) and Health Information Management and Technology (UMGC).

The proposed M.S. in Information will not focus on any of these particular areas, but more broadly explore information in the context of society. As a research-oriented program, the proposed M.S. in Information will train students in advanced concepts around research, methodology, and scholarship. As is common with Ph.D. programs, students will take coursework in a variety of areas where College of Information faculty have expertise, including technology and policy for digital accessibility, sociotechnical design for providing privacy, co-design of information technology for specific populations including children and older adults, protecting people from mis-and disinformation, and the ethical application of artificial intelligence and machine learning by both the private and public sectors.

In spite of the large number of master's programs that exist in the state under this CIP code or that include Information in the program title, program duplication is ultimately not an issue. This program will not be marketed as a master's program as it only exists as a program for students in UMD's Information Systems doctoral program.

E. Relevance to High-demand Programs at Historically Black Institutions (HBIs)

Again, this proposed program will exist only for students in UMD's Information Studies Ph.D. program. Bowie State University's master's program in Information Systems and Sciences is a professional oriented program geared toward business information systems. The proposed

[2] BLS data on Database Administrators and Architects: https://www.bls.gov/ooh/computer-and-information-technology/database-administrators.htm
[3] BLS data on Web Developers and Digital Designers: https://www.bls.gov/ooh/computer-and-information-technology/web-developers.htm
[4] Maryland Occupational Projects – 2022-2032-Workforce Information and Performance: https://labor.maryland.gov/lmi/iandoproj/maryland.shtml

Information Master of Science is not focused in this area but covers a broad range of information studies topics and focuses on training students in research to study these areas.

F. Relevance to the identity of Historically Black Institutions (HBIs)

We do not anticipate any negative impacts on the special identities of the HBIs in the state of Maryland. UMD already has an existing Information Studies Ph.D. program, as well as master's levels programs in Information Systems, Information Management, and Human-Computer Interaction. This program is only being created to serve as a credential for students who have completed 30 credits in the Ph.D. program.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

Curricular Development. Pursuing a doctorate is a substantial undertaking, and students leave Ph.D. programs for a variety of reasons, such as financial constraints, major life events, or an inability to conduct quality research at the highest level. We wish to provide an option for students who are unable to complete the Information Studies doctorate to have their work officially recognized by the University through conferral of a Master's degree. While the exit option is the primary goal for this program, we also acknowledge that some doctoral students in good academic standing may benefit from the along-the-way credentialing that this degree would provide.

The curriculum proposed for the M.S. in Information will provide students with crucial and foundational tools to broaden their understanding of the information field. This degree is intended to credential the difficult work that Ph.D. students do as pre-candidates, to master advanced concepts around research, methodology, and scholarship. The coursework accordingly follows the coursework for the Ph.D. program.

Faculty Oversight. As with the Ph.D. program, the M.S. program will be led by the College of Information. Appendix A is a list of faculty who will be teaching in the program.

Educational Objectives and Learning Outcomes. The learning outcomes for the program are as follows:

1. Synthesize concepts, ideas, and literatures foundational to the study of information;
2. Describe the diversity of theoretical and methodological frameworks in information studies;
3. Develop a collection of scholarly workflows, heuristics, and practices to produce high quality research in information studies;
4. Apply best practices in scholarly communication, including clear and succinct synthesis of prior literature, critical commentary, and compelling presentation of your own ideas;

5. Articulate an epistemological stance by recognizing what counts as data, evidence, and knowledge in the student's own work; and
6. Develop a personal philosophy about professional life which includes trajectories in research, teaching, service, and/or public engagement.

Institutional assessment and documentation of learning outcomes. Please see Appendix B for information about assessing the program's learning outcomes.

Course requirements. This is a 30-credit non-thesis master's degree, with no thesis option. Degree requirements are categorized into four distinct sections: Information Studies coursework (9 credits), Research Methods & Design coursework (9 credits), Electives chosen from a Specialized Area Courses (9 credits), and the Integrative Paper/Summative Assessment (3 credits).

Curriculum		
Course Number	Course Title	Credits
Information Studies coursework		
INST800	The Engaged Intellectual: An Introduction to Research and Academic Work	3
INST801	Theoretical and Epistemological Foundations in Information Studies	3
INST802	Pragmatic and Methodological Foundations for Information Studies	3
Research Methods and Design (9 credits from the following)		
INST627	Data Analytics for Information Professionals	3
INST633	Analyzing Social Networks and Social Media	3
INST710	User Experience Research Methods	3
INST725	Legal Research for Information Professionals	3
INST735	Natural Language Processing	3
INST737	Introduction to Data Science	3
INST808	Seminar in Research Methods and Data Analysis	3
Electives chosen from specialty area (9 credits)		
Integrative Paper/Summative Assessment		
INST789	Non-Thesis Research	3

A list of courses, including those that count for the elective category, is included in Appendix C.

General Education. Not applicable for our graduate programs.

Accreditation or Certification Requirements. No accreditation or licensure is required for this program.

Other Institutions or Organizations. The offering unit is not planning to contract with another institution or non-collegiate organization for this program.

Student Support. The college already has the administrative and advising infrastructure to provide student support as it already supports the doctoral program.

Marketing and Admissions Information. The master's program will be listed in the academic calendar and advisors will make students aware of the option, especially if students plan to leave the Ph.D. program.

H. Adequacy of Articulation

Not applicable for this graduate program.

I. Adequacy of Faculty Resources

Program faculty. Appendix A contains a list of faculty members who will teach in the program. As the courses already exist via the doctoral program, no new instructional resources are required.

Faculty training. Faculty teaching in the program will use the university's learning management system along with its extensive electronic resources. They will have access to instructional development opportunities available across the College Park campus, including those offered as part of the Teaching and Learning Transformation Center, many of which are delivered in a virtual environment. Instructors will work with the learning design specialists on campus to incorporate best practices when teaching in the online environment.

J. Adequacy of Library Resources

The University of Maryland Libraries assessment concluded that the Libraries are able to meet, with current resources, the curricular and research needs of the program.

K. Adequacy of Physical Facilities, Infrastructure, and Instructional Resources

All physical facilities, infrastructure, and instructional equipment are already in place. No additional resources are needed beyond what is in place for the doctoral program.

L. Adequacy of Financial Resources

Tables 1 and 2 contain the details of resources and expenditures.

Table 1 Resources:

Because the students progress through most of the program as Ph.D. students, the program is essentially supported through the reallocation of resources from the Ph.D. program. The coursework, instruction, facilities and administrative support are already in place in the college as the coursework is already offered through the doctoral program.

1. Line 1 shows the reallocated resources, essentially the tuition derived from Ph.D. courses for this small number of students.
2. Although tuition rates, credit totals, and number of students are provided, tuition revenue is not factored into the resources table as this revenue is derived from the doctoral program.
3. Graduate students will be paying tuition by the credit. The tuition revenue factors in a 60% in-state tuition rate.
4. Tuition rates assume a steady increase (3%) in the per-credit rate projected over five years.
5. No external sources of funding are assumed.
6. No other sources of funding are assumed.

Table 2 Expenditures:

1. Faculty salaries are based on cost per course. We assume an annual increase of 3% in salaries with a corresponding 33% benefits rate.
2. Administrative responsibilities (.1 FTE) will be provided by current departmental administrative staff.
3. Other expenditures include miscellaneous operational expenses.

M. Adequacy of Program Evaluation

Formal program review is carried out according to the University of Maryland's policy for Periodic Review of Academic Units, which includes a review of the academic programs offered by, and the research and administration of, the academic unit (http://www.president.umd.edu/policies/2014-i-600a.html). Program Review is also monitored following the guidelines of the campus-wide cycle of Learning Outcomes Assessment (https://irpa.umd.edu/Assessment/loa_overview.html). Faculty within the department are reviewed according to the University's Policy on Periodic Evaluation of Faculty Performance (http://www.president.umd.edu/policies/2014-ii-120a.html). Since 2005, the University has used an online course feedback survey instrument for students that standardizes course feedback across campus. The course survey has standard, university-wide questions and allows for supplemental, specialized questions from the academic unit offering the course.

N. Consistency with Minority Student Achievement goals

Students enter this program from the doctoral program, for which we strive for a diverse population in order for students to learn from each other's perspectives. The master's program is being proposed primarily so that students are able to earn a credential that they now cannot

receive if they leave the doctoral program. As a result, the program will serve to help students achieve a credential should they complete the doctoral coursework.

O. Relationship to Low Productivity Programs Identified by the Commission

N/A

P. Adequacy of Distance Education Programs

While primarily on-campus, the program will offer select online courses, providing flexibility for students balancing professional commitments. The online components will adhere to quality standards, ensuring an engaging and rigorous learning experience for all participants.

Table 1: Resource Table

Resources Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.Reallocated Funds	$40,000	$41,200	$42,436	$43,709	$45,020
2. Tuition/Fee Revenue (c+g below)	$0	$0	$0	$0	$0
a. #FT Students	2	2	3	3	4
b. Annual Tuition/Fee Rate	$24,864	$25,609	$26,378	$27,169	$27,984
c. Annual FT Revenue (a x b)	$49,727	$51,219	$79,133	$81,507	$111,936
d. # PT Students	1	1	1	1	1
e. Credit Hour Rate	$1,243.18	$1,280.47	$1,318.89	$1,358.45	$1,399.21
f. Annual Credit Hours	15	15	15	15	15
g. Total Part Time Revenue (d x e x f)	$18,648	$19,207	$19,783	$20,377	$20,988
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 - 4)	$40,000	$41,200	$42,436	$43,709	$45,020

Table 2: Expenditure Table

Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b+c below)	$26,600	$27,398	$28,220	$29,067	$29,939
a. #FTE	0.2	0.2	0.2	0.2	0.2
b. Total Salary	$20,000	$20,600	$21,218	$21,855	$22,510
c. Total Benefits	$6,600	$6,798	$7,002	$7,212	$7,428
2. Admin. Staff (b+c below)	$10,640	$10,959	$11,288	$11,627	$11,975
a. #FTE	0.1	0.1	0.1	0.1	0.1
b. Total Salary	$8,000	$8,240	$8,487	$8,742	$9,004
c. Total Benefits	$2,640	$2,719	$2,801	$2,885	$2,971
3. Total Support Staff (b+c below)	$0	$0	$0	$0	$0
a. #FTE	0	0	0	0	0
b. Total Salary	$0	$0	$0	$0	$0
c. Total Benefits	$0	$0	$0	$0	$0
4. Graduate Assistants (b+c)	$0	$0	$0	$0	$0
a. #FTE	0	0	0	0	0
b. Stipend	$0	$0	$0	$0	$0
c. Tuition Remission	$0	$0	$0	$0	$0
d. Benefits	$0	$0	$0	$0	$0
5. Equipment	$0	$0	$0	$0	$0
5. Library	$0	$0	$0	$0	$0
6. New or Renovated Space	$0	$0	$0	$0	$0
7. Other Expenses: Operational Expenses	$1,000	$1,000	$1,000	$1,000	$1,000
TOTAL (Add 1 - 8)	**$37,240**	**$38,357**	**$39,508**	**$40,693**	**$41,914**

Appendix A: Faculty Information

The following faculty members are projected to teach in the program. All faculty are full-time unless otherwise indicated.

Name	Highest Degree Earned, Program, and Institution	UMD Title (if part-time indicated)	Courses
Chris Antoun	PhD, Survey Methodology, University of Michigan	Assistant Professor	INST808
Wei Ai	PhD, Information, University of Michigan	Assistant Professor	INST750
Joel Chan	PhD, Cognitive Psychology, University of Pittsburgh	Assistant Professor	INST801, INST802
Eun Kyoung Choe	PhD, Information Science, University of Washington	Associate Professor	INST808
Tamara Clegg	PhD, Computer Science, Georgia Institute of Technology	Associate Professor	INST710
Sheena Erete	PhD, Technology and Social Behavior, Northwestern University	Associate Professor	INST802
Vanessa Frias-Martinez	PhD, Computer Science, Columbia University	Associate Professor	INST800, INST737
Amelia Gibson	PhD, Information, Florida State University	Associate Professor	INST808, INST680
Jen Golbeck	PhD, Computer Science, University of Maryland	Professor	INST808, INST633
Daniel Greene	PhD, American Studies, University of Maryland	Associate Professor	INST800
Naeemul Hassan	PhD, Computer Science, University of Texas-Arlington	Assistant Professor	INST808, INST737
Renee Hill	PhD, Library and Information Science, Florida State University	Principal Lecturer	INST620, INST622
Paul Jaeger	PhD, Information Studies, Florida State University; JD, Florida State University	Professor	INST613
Zubin Jelveh	PhD, Computer Science, New York	Assistant Professor	INST808

	University		
Jonathan Lazar	PhD, Information Systems, UMBC	Professor	INST725
Richard Marciano	PhD, Computer Science, University of Iowa	Professor	INST742
Diana Marsh	PhD, Anthropology, University of British Columbia	Assistant Professor	INST808, INST604
Susannah Paletz	PhD, Social/Personality Psychology, UC Berkeley	Associate Professor	INST808
Beth St. Jean	PhD, Information, University of Michigan	Associate Professor	INST800, INST808
Mega Subramaniam	PhD, Information Studies, Florida State University	Professor	INST800
Stephanie V. Valencia	PhD, Human Computer Interaction, Carnegie-Mellon University	Assistant Professor	INST710
Victoria Van Hyning	PhD, English Literature, University of Sheffield	Assistant Professor	LBSC731
Jessica Vitak	PhD, Media & Information, Michigan State University	Professor	INST808
Ping Wang	PhD, Information Systems, UCLA	Associate Professor	INFM600, INFM612, INFM620
Caro Williams-Pierce	PhD, Curriculum & Instruction, University of Wisconsin	Assistant Professor	INST802, INST730

Appendix B: Plan for Assessing Learning Outcomes

Assessment 1: Satisfactory Completion of Coursework

Students must complete a minimum of 30 graduate credit hours of coursework while matriculated at the University of Maryland. Coursework is taken in three areas:

- Information Studies Core Courses (9 credit hours)
- Research Methods and Design (9 credit hours)
- Specialized Area(s) (9 credit hours)
- Summative Assessment (3 credit hours)

Students should work with their advisors to select quantitative, qualitative, and/or mixed research methods courses, and specialized area(s) courses. Students must meet minimum requirements for "satisfactory progress" each year in the program to be allowed to continue. A 3.0 GPA must be maintained throughout the program (see Graduate School policy on Academic Standing). All graduate students must register for at least 1 credit hour each semester until graduation.

Students must receive at least a "B-" in the Information Studies Core Courses for satisfactory progress. If a student receives a "C+" or lower, the student must repeat the course and receive a B- or higher. Failing to do so results in dismissal from the program.

Appendix C: Course Descriptions

Information Studies Courses (9 credits required)

INST800 The Engaged Intellectual: An Introduction to Research and Academic Work (3 Credits)
An introduction to the academic life with a particular focus on what it means to undertake research, teaching, and service.

INST801 Theoretical and Epistemological Foundations in Information Studies (3 Credits)
Pursuing a doctorate in information studies involves the scholarly examination of the interaction between people, information, technology, and society. There are, however, as many ways to examine the interaction of people, information, technology, and society as there are researchers and ways of understanding what counts as evidence and knowledge in different components of the field. Students will be introduced to the diverse scholarly traditions that comprise information studies. Students will explore why there are so many ways of knowing and methods of discovery within the field, in order to help them identify the social theory and methods that will support their path through information scholarship.

INST802 Pragmatic and Methodological Foundations for Information Studies (3 Credits)
Information Studies' eclectic interdisciplinarity is both its greatest strength and its most significant weakness. As an increasingly multi/inter/trans/non-disciplinary intellectual community, Information Studies embraces a wide variety of conceptual frameworks, theories, methodological approaches, and intellectual traditions. As such, it is necessary to be able to bring many different intellectual perspectives to bear on the complex, nuanced, phenomena that are its focus. The variety in the intellectual toolbox of Information Studies is central to its ability to avoid reduction of its focal topics to trite, simplistic characterizations. However, the field's paradigmatic richness places particular burdens on the individual researcher. The purpose of this seminar is to help students develop a reflective practice that they can rely on to turn their interests into valuable new insights in an interdisciplinary domain like Information Studies.

Research Methods and Design (9 credits from the following)

INST627 Data Analytics for Information Professionals (3 Credits)
Skills and knowledge needed to craft datasets, perform quantitative and qualitative analyses, and develop information resources that bridge the gap between raw data and decision makers' needs.

INST633 Analyzing Social Networks and Social Media (3 Credits)
Introduces students to the science and social science of network analysis. Through real world examples, including analysis of their own social networks, students will develop skills for describing and understanding the patterns and usage of services like Facebook, Twitter,

YouTube, and others. Students will read classic and cutting edge articles and books about these topics and discuss their applicability to this new social media. The class will culminate with a capstone project in which students will apply the analysis methods they have learned to understanding a particular question about social networks and social media.

INST710 User Experience Research Methods (3 Credits)
Students will learn to conduct user research in industry and to provide foundational knowledge needed for academic research. It examines the theoretical and epistemological differences between research paradigms and provides an overview of qualitative, quantitative and mixed-method approaches. It overviews user-centered design (UCD) methods, and uses Contextual Inquiry/Contextual Design as the backbone for a research project, incorporating related formative UCD methods and techniques. It is a project-based course, where students conduct a semester-long project to prepare them for the HCIM Capstone as well as other types of formative user research.

INST725 Legal Research for Information Professionals (3 Credits)
An in-depth exploration the methods, resources, and context of conducting advanced legal research. After offering an overview of various types of legal materials, the course will focus on finding and analyzing legal materials through various primary sources, databases, secondary sources, and public records for government and corporate settings. The course will also discuss practical issues of conducting legal research, such as data management and budgeting.

INST735 Natural Language Processing (3 Credits)
Introduce fundamental concepts, techniques, and algorithms for the computational handling of natural language. Statistical and machine learning techniques, models, and algorithms that enable computers to deal with the ambiguity and implicit structure of human language. Approaches that focus on uncovering linguistic structure, such as syntactic or semantic parsing, as well as those that focus on manipulating text in useful ways, such as question answering or machine translation.

INST737 Introduction to Data Science (3 Credits)
An exploration of some of the best and most general approaches to get the most information out of data through clustering, classification, and regression techniques.

INST808 Seminar in Research Methods and Data Analysis (3 Credits)
Topics and issues in information studies research. Design and conduct of research project.

Integrative Paper/Summative Assessment (3 credits required)

INST789 Non-Thesis Research (1-3 credits)
Covers non-thesis research in the field of Information Studies.

Electives from Specialized Areas (9 credits required)

INFM600 Information Environments (3 Credits)
An exploration of various models and methodologies used to capture and deploy internal and external information and knowledge in a number of settings; organizational analysis in terms of information creation, flow, sharing, conservation, and application to problem solving; internal and external influences on the management of information and knowledge; various information flows; information management in a variety of settings.

INFM603 Information Technology and Organizational Context (3 Credits)
Application of communication and information technologies to support work processes, including technology-enhanced communication networks, computer-supported collaborative work, decision-support systems, interactive systems, and systems analysis. Acquisition of information systems and their integration into the organization.

INFM605 Users and Use Context (3 Credits)
Use of information by individuals. Nature of information. Information behavior and mental models. Characteristics of problems, task analysis, problem solving, and decision making. Methods for determining information behavior and user needs. Information access. Information technology as a tool in information use.

INFM612 Management Concepts and Principles for Information Professionals (3 Credits)
Key aspects of management - focusing on planning, organizing, leading and controlling. The evolution of management, innovative management for the changing world, management styles and leadership, managerial planning, goal setting and decision making. Ethical issues, designing adaptive organizations responding to change, global environment, diversity, and utilizing the appropriate technology to provide effective management of information programs and services.

INFM620 Introduction to Strategic Information Management (3 Credits)
Strategic management is the comprehensive collection of tasks, activities, and processes organizations use to coordinate and align resources and actions with its mission, vision, and strategy. Due to changes occurring in our global landscape, the integration of business and technology is compelling organizations to move beyond traditional, reactive, and silo-based data management approaches to a managed, predictive approach that treats information as a strategic asset and uses it to create business value. To meet challenges of this hyper-competitive environment, this course will provide you with an introduction to the strategic management of information assets for competitive differentiation and sustained business success.

INFM700 Information Architecture (3 Credits)

Principles and techniques of information organization and architecture for the Web environment. Structured description of digital resources, including data modeling techniques, metadata schemes, and user-oriented navigation systems.

INFM711 Financial Management of Information Projects (3 Credits)
Techniques and strategies of planning and executing successful projects. Project budgets, work breakdown structures and scheduling techniques, earned value, tracking and reporting project costs, risk management, best practices, and cost/benefit analysis.

INFM714 Principles of Competitive Intelligence (3 Credits)
Intelligence process and how to build business advantage by the collection and analysis of the capabilities, vulnerabilities, market positioning and strategic planning of competitors using open source information.

INFM718 Selected Topics in Information Management (1-3 Credits)
Selected topics in information management.

INFM732 Information Audits and Environmental Scans (3 Credits)
Methods and techniques to monitor organizational environment to identify opportunities and threats and relate them to the strengths and weaknesses of the organization to fulfill organization information needs and their sustainability. Information audit to determine the existing information environment by assessing the information needs of the organization, determining the information currently available. Application of information audits and environmental scans in strategic information management.

INFM735 Internship in Information Management (3 Credits)
Introduction to information management issues in the workplace, including the knowledge, skills, and experience necessary for success in high-impact information management positions. Securing and facilitating mentor relationships, and the development of actionable professional development plans.

INFM747 Web-Enabled Databases (3 Credits)
Basic methods and tools for developing dynamic, database-driven web sites. Acquiring, installing, and running web servers, database servers, and connectability applications. Developing web interfaces and application-layer components.

INFM757 Organizational and Business Process Modeling (3 Credits)
General principles of modeling, including methods for modeling organizational and business process for information applications and strategy development. Approaches to evaluating models based on their accuracy and usefulness.

INST600 Foundations for Librarians and Information Professionals (3 Credits)

An introduction to the field of library and information science (LIS), its history, and future direction that provides students with an understanding and appreciation of the nature and functions of the profession(s) they have entered. The focus is on core concepts underlying the LIS discipline, with particular emphasis on professional ethics/values, diversity, equity, inclusion and accessibility (DEIA), and the ways in which technology has shaped and continues to shape the field.

INST603 Systems Analysis and Design (3 Credits)
Formal process for planning and designing an information technology system, including identifying users and other stakeholders, analyzing work processes, preparing system specifications, conducting feasibility and usability studies, and preparing for implementation. Approaches to analyzing system components and functions. Measurement and evaluation of system performance.

INST604 Introduction to Archives and Digital Curation (3 Credits)
Overview of the principles, practices, and applications in the archival and digital curation fields.

INST607 Government Information (3 Credits)
An introduction to the nature and scope of government information (federal, state, and local). Tracing the ongoing efforts of government agencies to offer information, services, and resources online, this course also examines the nature and current impact of new technologies on participatory democracy. More specifically, the course explores information and communication technologies designed to make government more open and transparent; the design, implementation, and evaluation of new government and governance mechanisms, including through the use of social media and AI; the role of legal authorities and information institutions such as libraries in supporting access to government information; and the development and implementation of selected public facing online tools (e.g., data visualization, crowd-sourcing, etc.).

INST608 Special Topics in Information Studies (1-3 Credits)
Covers special topics in information studies.

INST610 Information Ethics (3 Credits)
Investigation of the diverse range of ethical challenges facing society in the information age. Ethical theories, including non-Western and feminist theories. Application of theories to information ethics issues.

INST611 Privacy and Security in a Networked World (3 Credits)
Evolving conceptualization of privacy and security issues in light of technological developments in the 21st century. Analysis of legal, ethical, design, and socially constructed challenges that organizations and individuals face when developing privacy and security solutions.

INST612 Information Policy (3 Credits)
Nature, structure, development and application of information policy. Interactions of social objectives, stakeholders, technology and other forces that shape policy decisions.

INST613 Information and Human Rights (3 Credits)
An examination of information as a human right, including topics: social, cultural, economic, legal, and political forces shaping information rights; the impact of information rights on information professions, standards, and cultural institutions; and information rights and disadvantaged populations.

INST614 Literacy and Inclusion (3 Credits)
The educational and psychological dimensions of helping and supporting new users to become information literate and experienced users to remain engaged.

INST615 Information Professionals and the Law (3 Credits)
An exploration of the interrelated issues of the provision of and information literacy about legal information by information organizations and the impacts of legal issues, such as privacy and filtering, on the practice of information organizations that serve the public.

INST616 Open Source Intelligence (3 Credits)
An introduction to Open Source Intelligence (OSINT) for Information Professionals. For the purposes of this course, OSINT is defined as the use of free, publicly available online sources to gather information about people, organizations/groups, places, businesses, activities/events, and capabilities. Collected information is used to conduct analysis or reach conclusions with estimated level of certainty. Students will learn basic and advanced techniques for using search engines, people directories, social networks, location-based services, images and videos, public records, domain analytics, documents, archives, and other sources. Throughout the modules, data quality and validation procedures will be key topics. Professional applications of the skills taught are extensive and include libraries, law offices, journalism, human resources, competitive intelligence, law enforcement, opposition research, government agencies, ethical hacking, and many more.

INST617 Computational Journalism (3 Credits)
Designed to teach the application of computational methods in journalism and reporting. The methods include natural language processing, visualization, and web data mining. The course will also cover the necessity and impact of journalistic ethics in designing computation solutions.

INST620 Diverse Populations, Inclusion, and Information (3 Credits)
Importance of equality of information access. Social, political, and technological barriers to information. Information needs of diverse and underrepresented populations. Principles of inclusive information services.

INST621 Managing Digital Innovations in Organizations (3 Credits)
Students will learn the main theoretical perspectives on managing digital innovations, become familiar with current best practices of innovating with IT, and develop innovation skills in various organizational settings such as project teams, functional departments, organizations, communities, and society at large.

INST622 Information and Universal Usability (3 Credits)
Information services and technologies to provide equal experiences and outcomes to all users. Laws, standards, approaches, component concepts, access needs, and technologies in relation to physical and online information environments.

INST630 Introduction to Programming for the Information Professional (3 Credits)
An introduction to computer programming intended for students with no previous programming experience. Topics include fundamentals of programming and current trends in user interface implementation that are relevant to information professionals.
Restriction: Permission of INFO-College of Information Studies.

INST632 Human-Computer Interaction Design Methods (3 Credits)
Methods of user-centered design, including task analysis, low-tech prototyping, user interviews, usability testing, participatory design, and focus groups.

INST638 HCI Professional Preparation Seminar (1 Credit)
The human-computer interaction area is huge and diverse, yet all HCI professionals will face a common set of challenges upon embarking into their future careers, including job hunting, interviewing, joining a team, managing group dynamics, and staying abreast of current technology. Students will learn how to tackle these challenges from a series of speakers familiar with current industry practice.

INST639 Practical Skills in HCI (1-3 Credits)
Current industry practice in the HCI and UX field involves being familiar with many practical skills and specialized software. In this repeatable course, HCIM students will be able to acquire some of these vital practical skills in order to be better prepared for joining industry upon graduation. Furthermore, this will also be an opportunity for students to develop their portfolio for future job hunts. Offered in both Fall and Spring semesters, the intention is for these "practical skills" to be taught by professional instructors with expert knowledge. The content of the course will vary from semester to semester, but here is a sample of topics: Graphic and visual design and communication; UX design and research in games; Voice and gestures; UX mockups and wireframing tools; Practical web design and technologies; UX project management software.

INST640 Principles of Digital Curation (3 Credits)
Principles for the design and implementation of long-term curation of digital data and information assets, including born-digital and digitized assets. Frameworks for analysis of

technical, practical, economic, legal, social and political factors affecting digital curation decisions. Case studies of specific digital curation scenarios.

INST641 Policy and Ethics in Digital Curation (3 Credits)
Discussion of strategies to address intellectual property, privacy, security and other policy and ethics concerns raised by the curation of digital records and data.

INST643 Curation in Cultural Institutions (3 Credits)
An overview of the principles, practices, and current debates in the management, care and representation of digital artifacts in libraries, archives, and museums.

INST644 Introduction to Digital Humanities (3 Credits)
A survey of the history, methods, and principal topics of the Digital Humanities, examined from theoretical and applied perspectives.

INST645 Personal Digital Curation (3 Credits)
Discussion and workshop in selecting and preserving digital personal data and records.

INST646 Principles of Records and Information Management (3 Credits)
Principles and practices of managing records in the context of information management programs in government, corporate and other institutional settings. Includes access; legal requirements; digital technologies; and creation, administration, appraisal, and retention and disposition of records.

INST647 Management of Electronic Records & Information (3 Credits)
Focuses on the life cycle of records and the impact of technology programs for managing electronic records. Explores the roles of records managers in the management of electronic records.

INST650 Facilitating Youth Learning in Formal and Informal Environments (3 Credits)
The historical, organizational, and contemporary contexts of formal and informal learning spaces; the principles of teaching, learning, and information literacy that underlie the formal and informal learning spaces; and the leadership role that information professionals can play within their schools, libraries and communities.

INST651 Promoting Rich Learning with Technology (3 Credits)
Exploration of how technology can be used to promote rich learning experiences, with a particular focus on youth populations. Assessment of the how, when, and why of infusing technology into the teaching and learning process.

INST652 Design Thinking and Youth (3 Credits)
Methods of design thinking specifically within and for youth contexts, including user-centered design, understanding user needs, ideation, contextual design, participatory design, iterative

prototyping, and visual design. These topics will specifically be studied in the context of designing with and for youth.

INST653 Introduction to Museum Scholarship (3 Credits)
Provides students a basic understanding of museums as cultural and intellectual institutions. Topics include the historical development of museums, museums as resources for scholarly study, and the museum exhibition as medium for presentation of scholarship.

INST660 Strategic Leadership (3 Credits)
Students will use research and best practices to act and think like a leader, increase your self-awareness, and learn how to unlock potential in others. From the stories of great leaders and everyday people, you will learn and practice empowerment, accountability, courage, creativity, and humility, which are the key leadership skills. In addition, this course will teach you how to create new opportunities and lasting impact to drive growth and value creation in your organization.

INST661 Introduction to Game, Entertainment, and Media Analytics (3 Credits)
With the continuing global growth in the Game, Entertainment, and virtual/augmented reality and immersive experiences industries, entertainment providers increasingly depend on data analytics to maintain a competitive edge while continuing to improve the customer experience. This course provides an overview of the Game, Entertainment, and Media (GEM) industries, discuss the relationships between the entertainment providers and the entertainment consumers, and explore the analytical techniques used to maximize the overall value to both the providers and consumers. The course will focus on the uses of analytics methods such as personalization, recommendation, clustering and segmentation, behavioral analytics, etc., will discuss core data management and data architecture concerns, and examine how big data infrastructure can support scalability as data volumes grow and as streaming speeds accelerate. In addition we review socio-technical aspects of entertainment, especially in the areas of cyberpsychology, social networks, and information policy concerns such as privacy protection, fraud, equity, and national security concerns.

INST670 Introduction to Javascript Programming (1 Credit)
Introduction to the fundamentals of Javascript programming. Basic components of all programming languages, including variables, types, data structures, and control flow, with a focus on leveraging Javascript libraries for more advanced functionality. No prior experience needed.

INST671 Introduction to Web Programming (1 Credit)
Introduction to the fundamentals of designing and programming web sites. HTML programming extended by work with Cascading Style Sheets. Programming skills are complemented with fundamentals of design and usability. No prior programming experience needed.

INST673 Hands On Machine Learning with Weka (1 Credit)

Students will receive hands on experience with the open-source machine learning tool Weka. Topics covered will be classification, regression, basic algorithm types, how to get data into a format Weka can process, how to interpret results, and basic document classification. The class will meet online.

INST680 Health Informatics (3 Credits)
An introduction to the ways in which medical data, information, and knowledge are created, stored and used. Students will gain an understanding of the current trends in the delivery of medical care and the ways in which these trends influence health information resources and systems.

INST681 Health Information Behavior (3 Credits)
Exploration of information needs of healthcare professionals and the general public, as well as how they seek information to fulfill these information needs, impacts and outcomes of health-related information-seeking by multiple populations. Examination of models and theories and empirical studies of patient and healthcare professional information behavior.

INST682 Personal Health Informatics & Visualization (3 Credits)
Personal Health Informatics cover a broad concept that encompasses an array of approaches to collect, store, share, analyze, and reflect on personal health data. Not only health care providers are relying on Health Technologies to improve patient care, people are increasingly using health devices and apps in their everyday life. Individuals have started using new technologies to collect data, increase awareness, and reflect on and change their behaviors. They also use various tools for curiosity and fun. This course will provide an overview of this exciting field and examine how social and behavioral theories can be applied to create effective health applications.It is difficult to create health technologies that can successfully be integrated into people's daily life due to many obstacles in individuals' data collection, integration, self-reflection, and sharing practices. Understanding these challenges is an important part of designing Health Technologies. Therefore, this course will cover HCI and design thinking methods that you can leverage in understanding the adoption of Health Technologies. Moreover, visualizations facilitate people to gain insights from their data, so we will cover common visualization approaches used in the personal data contexts.

INST701 Introduction to Research Methods (3 Credits)
Techniques and strategies of research as applied to the definition, investigation, and evaluation of information problems. Qualitative, quantitative, and mixed methods of research design methods are considered from the aspects of implementation, analysis, and interpretation.

INST702 Advanced Usability Testing (3 Credits)
Usability test design, implementation and analysis for computer and mobile devices; special attention will be paid to remote testing. Students will learn the complex process of coordinating and facilitating a usability test and how to synthesize test data into reports appropriate for various audiences.

INST703 Visual Design Studio (3 Credits)
This hands-on studio course will help students develop foundational visual skills related to user experience (UX) design. Students will explore methodologies and processes used in many of the industry's top creative environments and study the entire visual design skillset, including concept development, content creation, system design, and tools and process.

INST704 Inclusive Design in HCI (3 Credits)
An introduction to inclusive technology design, that is, the design and evaluation of user interfaces for diverse users and use contexts. Building on basic concepts in human-computer interaction, students will learn about design exclusion and barriers to use, and methods by which these can be overcome. Assistive input and output technologies will also be covered. Populations include older adults, users with visual, cognitive or motor impairments, users who are deaf or hard of hearing, children, users in low resource contexts, and users in mobile contexts. Research trends and practical design considerations (e.g., web accessibility requirements) will be covered. Students will interact with the material through readings, discussion, and individual and group assignments.

INST705 Game Design Studio (3 Credits)
Learn the fundamentals of game design by applying elements and principles of game design, such as goals, rules, and challenges, to create board games, card games, and digital games. Students will be introduced to the basic tools and methods of game design: paper and digital prototyping, design iteration, design critique, and user testing. Students will design several games of different types to add to a growing portfolio of game design concepts. Students will also learn how to use their skills to deconstruct and critique the components of existing games, as well as gain an understanding of the role of the game designer in real-world game development teams.

INST706 Project Management (3 Credits)
Comprehensive overview of project management, focusing on the needs of information resource (IR) projects. Concepts and techniques for planning and execution of projects including developing work breakdown structure, estimating costs, managing risks, scheduling, staff and resource allocation, team building, communication, monitoring, control, and other aspects of successful project completion.

INST711 Interaction Design Studio (3 Credits)
Covers basic interaction design principles and design process from a studio-based design perspective. Focuses on how to design for interactions that will resonate with your audiences: how the features and functions of a project get translated into something people find usable, useful, and desirable. Explores the role of interaction designers. Students design and prototype interactive products, systems, and services.

INST713 Futures of Work (3 Credits)

Are robots taking our jobs? Are there any jobs even worth taking? What other futures of work might we build? This course examines these questions by focusing on the labor process of computer-supported collaborative work (CSCW) in domains ranging from transportation to software development to sex work, drawing on research and theory from sociology, organizational studies, HCI, and more. Design-oriented students will be encouraged to develop interventions to enhance not just productivity but autonomy and democracy. Research-oriented students will learn to study workplaces and situate shopfloor developments in global political economy.

INST714 Information for Decision-Making (3 Credits)
The use of information in organizational and individual decision-making. An examination of managers' behavior in using information; differences between the private and public sectors; and the roles of information professionals and information systems in decision-making.

INST715 Knowledge Management (3 Credits)
Nature, creation, acquisition, and use of knowledge. Strategic role of knowledge in organizations and institutions. Information and knowledge ecology. Structure and functions of knowledge management systems and the role of the Internet and intranets. Knowledge as intellectual capital. Roles of librarians and information professionals in the knowledge economy. Strategic issues and future trends.

INST716 Information, Technology, and Society (3 Credits)
An exploration of the mutually constitutive relationship between information technology (IT) and society, including how IT transforms society and how society transforms IT.

INST726 Information Governance (3 Credits)
Offers a comprehensive introduction to information governance, an emerging discipline concerned with how organizations minimize risk and maximize the value associated with their information assets. Drawing from real-life examples from the private and public sectors, the course will explore important facets of information governance, including how institutions incorporate best practices in records and information management, data storage and archiving, e-discovery, privacy, cybersecurity, analytics, risk management, and compliance. The course will also provide practical lessons in developing a state-of-the-art information governance program.

INST728 Special Topics in Information Studies (1-3 Credits)
Selected topics in information studies.

INST729 International Opportunities in Information Studies (3 Credits)
Short term, experiential course offered in conjuction with the University's Study Abroad Office, to volunteer, complete a project, or conduct research in a library or information organization outside the U.S. Focus and location varies.
Formerly: LBSC708S and LBSC729.

INST730 Games as Emergent Experiences (3 Credits)
Videogames are designed objects that players bring their own history to, resulting each time in a unique emergent experience. If you've ever wondered why you love a certain game but others hate it, why you prefer one genre of game over another, or why the frustration you feel in complicated games is often actually enjoyable, this is the class for you! We will examine design principles instantiated in various games, analyze how failure and feedback support productive gameplay, discuss how mechanics and aesthetics contribute to emergent experiences, and develop an understanding of the field of games scholarship.
Credit Only Granted for: INST608K, INST408K or INST730.
Formerly: INST608K.

INST732 Entertainment Theory (3 Credits)
An entertainment environment is a setting in which audiences interact with content developed to please, charm, cheer, interest, engage, and enthrall distinct individuals and groups. Entertainment environments surround us in all parts of our lives-this course aims to dissect them using a foundation of entertainment theory, including a set of models and theories examining motivations for entertainment consumption; selection of content; processing of content; evaluation of content; and cognitive, attitudinal, and behavioral effects of content.

INST733 Database Design (3 Credits)
Principles of user-oriented database design. Requirements analysis. Data modelling. Data integrity and security and multi-user databases. Implementing an information system using a database management system (DBMS).

INST734 Information Retrieval Systems (3 Credits)
Principles of organizing and providing access to information using automated information storage and retrieval systems. Retrieval systems models, index language selection, data structure, user interfaces, and evaluation for text and multimedia applications.

INST736 Computational Linguistics II (3 Credits)
Natural language processing with a focus on corpus-based statistical techniques. Topics include: stochastic language modeling, smoothing, noisy channel models, probabilistic grammars and parsing; lexical acquisition, similarity-based methods, word sense disambiguation, statistical methods in NLP applications; system evaluation.

INST741 Social Computing Technologies and Applications (3 Credits)
Tools and techniques for developing and configuring social computing applications. Theories and paradigms for social computing. Strengths and limitations of different application styles and types. Evolution of applications as responses to social computing challenges. Information and organizational systems co-development.

INST742 Implementing Digital Curation (3 Credits)

Management of and technology for application of digital curation principles in specific settings. Characteristics, representation, conversion, and preservation of digital objects. Application of standards for digitization, description, and preservation. Planning for sustainability, risk mitigation and disaster recovery.

INST745 Introduction to Digital Arts Curation (3 Credits)
Representation and curation of art artifacts through digital media, with a focus on how to collect and manage born-digital artifacts, digitized artifacts, and their related data and metadata.

INST746 Digitization of Legacy Holdings (3 Credits)
Through hands on exercises and real-world projects, students will learn how to incorporate digitization of analog holdings into an existing archival program and how to link records of different formats and from different collections together.

INST747 Research in Advanced Digital Curation (3 Credits)
Students will build their ability to understand the complexity of research strategies and apply tools involved in the management and use of digital information in the Age of Big Data. The class will contain class lectures, class discussions, assigned readings, and extensive hands-on experience with student experience in digital curation projects. The research projects are focused around six major themes that will engage students in multiple arenas of research in Big Data. These are: community displacement, refugee narratives, movement of people, citizen internment, racial zoning, and cyberinfrastructure for digital curation. Project participants will have the opportunity to work with external stakeholders.

INST750 Advanced Data Science (3 Credits)
Application of data science techniques to unstructured, real-world datasets including social media and geo-referenced sources. Techniques and approaches to extract information relevant for experts and non-experts in areas that include smart cities, public health, and disaster management.

INST751 IoT and Streaming Data Analytics (3 Credits)
An increasing number of sensors, actuators, Internet-connect instruments and apparatuses, smart devices, and systems are generating and broadcasting a wide variety of continuous data streams. Machine-generated structured data sources are joined by a myriad of unstructured data streams from social media, weather, and news sources, among others. Integrated into networks, these continuously-streaming devices (collectively referred to as the Internet of Things, or IoT) provide a fertile array of data sources that can be ingested and analyzed to inform and automate decision processes for numerous purposes including operational intelligence, process monitoring, optimization, risk management, personalization, and prediction in real time. This course looks at architectures and operational modes for streaming data sources and examine methods for descriptive analytics, creation of predictive models, and integrated deployment of these models via centralized and edge computing resources. We will

discuss a variety of uses cases for streaming data analytics and how they are applied in different industries including public utilities, smart cities, manufacturing, telecommunications, and healthcare.

INST752 Location Intelligence (3 Credits)
Provides a comprehensive overview of the principles of geographic information systems and location analytics for a variety of business scenarios. Explores the processes for integrating location information, maps, and demographic information with business information and implementing analytical applications. Reviews business contexts such as government and citizen analysis, zoning and planning, retail site selection, supply chain management and logistics, fieldservice planning and tracking, real estate, insurance, public safety, municipal maintenance, and others. Provides hands-on opportunities to apply location intelligence methods.

INST753 Data Governance and Data Quality (3 Credits)
Surveys the methods and practices for understanding the relationship between organizational performance objectives and their effective oversight, use, and management of information. Examines methods for instituting information governance, data governance, and data quality in the context of information policies for assessing information risk, observing data policies, and enforcing accountability for protection of sensitive information. Explores models of data ownership and accountability, roles and responsibilities for data governance and data stewardship, and processes for soliciting and documenting information and data requirements. Covers techniques for data quality assessment, specification of data quality rules, and applications for validating compliance with data quality expectations, monitoring levels of data quality, and notifications and dashboards for monitoring data compliance.

INST754 Data Integration and Preparation for Analytics (3 Credits)
Provides a comprehensive overview of the end-to-end processes for acquiring, ingesting, managing, cleansing, transforming and integrating data sources for the purposes of reporting andanalytics. Concepts include data acquisition, data streaming, data staging, standardization, data quality, concept and metadata harmonization, transformation, and data modeling. Students will learn how ingested data sets can be transformed, integrated, and prepared for analytical use.

INST755 eGovernment for Smart Cities (3 Credits)
Federal, state, and local government entities are increasingly communicating, interacting, and providing services digitally in an online and networked environment. Concurrently, urban planners and administrators seek to leverage the potential of rapidly evolving technologies to transform service provisioning for the efficient management of assets and resources, with the goal of creating sustainable, livable, innovative, and economically vibrant cities and communities. This course will examine the intersection of these two developments and provide a framework for understanding the technical, policy, and information management issues that are emerging.

INST756 Information Risk Management (3 Credits)
Looks at information system threats, vulnerabilities, risk assessment and management. Explores how regulations scope and define what is considered to be protected information. Considers how data assets are assessed and classified in terms of their levels of sensitivity. Discusses specifying data protection policies and the techniques for enforcing compliance with those policies.

INST760 Data Visualization (3 Credits)
Introduction to the science and technology of data visualization--the graphical representation of data to aid understanding--and includes both theoretical foundations as well as practical applications of integrated visualization techniques on real-world problems. Application of these techniques to state-of-the-art problem domains within research, society, and industry.

INST762 Visual Analytics (3 Credits)
Visual analytics is the use of interactive visual interfaces to facilitate analytical reasoning. In essence, visual analytics is based on the--not uncontroversial--idea that humans and computers working alone are insufficient for the data challenges of today and tomorrow, and that effective synthesis of both humans and computational algorithms are needed to create human-in-the-loop systems. Thus, visual analytics bridges human-centered disciplines such as visualization and human-computer interaction with computation-centered disciplines such as machine learning, probabilistic methods, and knowledge discovery. The course contents will include both theoretical foundations of this interdisciplinary science as well as practical applications of integrated visual analysis techniques on real-world problems.

INST764 Data Literacy for Arts and Entertainment Management (3 Credits)
This survey course provides an overview of the integral use of data and information to manage, inform the operations, engage customers, patrons, and donors, and influence product/exhibit/program design in arts and entertainment businesses and organizations. The course will introduce core concepts of data literacy such as metadata and data management for collection curation and management, information seeking behaviors and enabling search, data management for business operations, descriptive analytics for reporting, using data for customer relationship management, and more advanced analytics. The course will explore how all these concepts fit together in the context of Arts and Entertainment Management and provide laboratory projects that provide hands-on experience with the different information and data management practices discussed.

INST765 Programming on the Web (3 Credits)
Non-programmers will learn basic programming and how to develop familiarity with web formatting and programming paradigms, including XML, REST, APIs, and authentication schemes. The class begins with an introduction to basic programming and students build on those skills by programming applications that use web-based data and services.

INST767 Big Data Infrastructure (3 Credits)
Principles and techniques of data science and business intelligence. Technologies and architectures for large-scale data warehousing and scale-out data analytics platforms. Supervised and unsupervised data mining.

INST771 Foundations of Cybersecurity (3 Credits)
Explores the foundational concepts of cybersecurity including the Threat Landscape, the evolution and structures of the global telecommunications network, key communication protocols and foundations of networks, the history, culture and emergence of the hacking process, and the core motivations and tactics of threat actors.

INST772 Policy and Practice of Ethical Hacking (3 Credits)
Provides students with an understanding of the ethical frameworks and technical approach in the conduct of penetration testing and ethical hacking. Students will work with real systems in real environments and will leverage real vulnerability analysis and exploitation tools in a live environment. Upon completion, students will understand the overall concepts guiding penetration testing from a practical, hands-on vantage point.

INST773 Cyber Intelligence Fundamentals (3 Credits)
Provides students with an understanding of how to identify, track, and report on malicious activity. Students will learn to identify and work with malware and network data and pair it with a broader set of threat intelligence information to draw conclusions based on the totality of open source information and network intelligence. Students will gain a in depth understanding of the principles of cyber threat intelligence and techniques applied in the cyber threat industry. Students will engage in in-depth discussion and practice in evaluating and interpreting indicators of compromise, command and control, and artifacts left by malicious actors.

INST779 Readings Seminar (1 Credit)
Readings in emerging topics. Through readings and discussion the class will critically assess future directions and highlight intersection points with other disciplines (e.g., medicine) and sub-disciplines of information studies and computer science (e.g., information retrieval, computer vision, machine learning). One or more themes will be covered over the semester (e.g., inclusive design, health informatics, environmental sustainability, social networking) and will be chosen based on instructor and student interest.

INST782 Arrangement, Description, and Access for Archives (3 Credits)
Introduction to the key concepts and practices involved with arrangement and description of archives, and the techniques appropriate to enable users to access archival information in traditional and nontraditional archival contexts.

INST784 Digital Preservation (3 Credits)

Issues and practices regarding digitization of analog materials and preservation of digital materials, both digitized and born digital.

INST785 Documentation, Collection, and Appraisal of Records (3 Credits)
Development of documentation strategies and plans; collecting policies to guide programs in acquiring records; theories and techniques for appraising records to identify those with continuing value.

INST786 Museum Research Seminar (3 Credits)
A research seminar focusing on the practice and presentation of cultural and historical scholarship in museums and historical sites. Students will complete an original research project on the challenges and opportunities of public exhibition and interpretation of cultural and historical research.

INST811 Pedagogy and Curriculum Development (3 Credits)
In this course, doctoral students will gradually and iteratively build a syllabus for an original course related to Information Studies. The course will cover, in sequence: curriculum models and development; learning outcome development; syllabus development; classroom management and dynamics; design of student assessments; design and delivery of classroom lectures; discussion moderation; working with teaching assistants; hybrid and online pedagogy; learning outcomes assessment; course evaluations; and teaching statements. Upon completion of the course, students will have a fully developed teaching portfolio.

INST878 Special Topics in Information Studies (3 Credits)
Seminar topics offered as faculty and student interests warrant. Topic varies.

LBSC611 History of the Book (3 Credits)
Introduction to the history and development of the book from pre-printing and incunabula to the post-modern book. Book illustration; publishing; collecting.

LBSC641 Selecting and Evaluating of Resources for Learning (3 Credits)
Policies and procedures for collection development, including identifying, evaluating, acquiring, providing, and promoting resources in all formats, to support learning and teaching in elementary and secondary schools.

LBSC644 Collection Development (3 Credits)
Activities through which library collections are systematically developed and managed are explored, especially the formulation and implementation of written collection development policies. Other specific topics include identification of user needs; collection evaluation; fund allocation among competing departments, subjects, and/or media; selection methods; intellectual freedom; storage alternatives; and cooperative collection development.

LBSC645 Literature and Materials for Children (3 Credits)

Survey of literature and other materials for children and youth. Criteria for evaluating and using such materials as they relate to the needs, interests, reading abilities, and other capabilities of young readers.

LBSC646 Literature and Materials for Young Adults (3 Credits)
Survey of literature and other materials for older children and adolescents. Criteria for evaluating and using such materials as they relate to the needs, interests, reading abilities, and other capabilities of young readers.

LBSC647 Children's Services in the Public Library (3 Credits)
Public library services for children, birth to 12 years of age. Developmental characteristics and information needs of children. Children as a client group. Programming and collection development. Management of children's services, including planning, staffing, and advocacy.

LBSC702 User Instruction (3 Credits)
Critical analysis of the rationale, content, and processes of user instruction in library and information settings.

LBSC706 Seminar in International and Comparative Librarianship and Information Science (3 Credits)
Comparison and contrast of bibliographic systems, institutions, service arrangements, and professional patterns in developed and developing cultures. Libraries, information organizations, and international information systems viewed against the backdrop of national cultures. Influences of social, political, and economic factors upon these forms.

LBSC708 Special Topics in Library and Information Science (1-3 Credits)
A special topics course with content determined by individual instructors. For questions about the content of the course contact the College of Information Studies.

LBSC709 Independent Study (1-3 Credits)
Intensive individual study, reading, or research in an area of specialized interest under faculty supervision.

LBSC713 Planning and Evaluating Library and Information Services (3 Credits)
An investigation of quantitative and qualitative methods used to plan and evaluate the effectiveness of library and information services. Planning and evaluation methodologies will be analyzed and critiqued. Selected methods will be demonstrated and/or utilized.

LBSC723 Advocacy and Support for Information Services (3 Credits)
Role and influence of government, foundations, associations, and other organizations in supporting and setting the agenda for information services of all types. Role of information professionals in demonstrating advocacy, fund-raising, public relations, lobbying, and seeking external support.

LBSC724 Public Library Seminar (3 Credits)
Organization, support, and service patterns of public libraries. The public library in national, state, and local contexts.

LBSC731 Special Collections (3 Credits)
Management of special collections, whose holdings may include manuscripts (particularly personal papers), non-textual materials, graphical materials, and rare books, with analysis of the custodial and management functions associated with special collections.

LBSC734 Seminar in the Academic Library (3 Credits)
Role of the academic library within the framework of higher education. Planning programs and services, collections, support, fiscal management, physical plant, and cooperation.

LBSC741 Seminar in School Library Administration (3 Credits)
Development, management, and evaluation of school library programs at all levels.

LBSC742 Collaborative Instructional Design and Evaluation (3 Credits)
School librarians' collaborative role in instruction. Systematic design, development, and evaluation of instructional strategies and products for learning.

LBSC745 Storytelling Materials and Techniques (3 Credits)
Literary sources and instruction and practice in oral techniques.

LBSC748 Advanced Seminar in Children's Literature (3 Credits)
Selected topics in literature for children and adolescents, including historical aspects, individual authors, and major themes and trends.

LBSC753 Information Access in the Social Sciences (3 Credits)
Research methods, information needs, information structure, and information sources and services in the social sciences (for example, anthropology, economics, education, geography, history, political science, psychology, sociology).
Prerequisite: LBSC650 or LBSC602; or permission of instructor.
Restriction: Permission of INFO-College of Information Studies.

LBSC770 Metadata and Tools for Information Professionals (3 Credits)
Principles, standards, and practices of information representation to facilitate accessing needed information in digital bibliographic environments. Includes exposure to Metadata, XML, RDA/AACR2R, DTDs, MARC, Dublin Core, MODS, ISBN and ISSN, FRBR, FRAD, Classification systems, and Controlled Vocabularies such as LCSH, SEARS, NLM, Getty and ERIC Thesauri, and others.

LBSC773 Classification Theory (3 Credits)

Survey of classificatory principles from bibliographic, philosophical, biological, psychological, and linguistic perspectives. Challenges to traditional principles from the cognitive sciences and their implementations for bibliographic classification.

LBSC774 Seminar in Linguistic Topics (3 Credits)
Topics in linguistics with applications in information science. Syntax and semantics as they apply to the analysis of communication processes and to natural language processing for information storage and retrieval.

LBSC775 Indexing, Abstracting and Thesaurus Construction (3 Credits)
Fundamentals of indexing, abstracting, and thesaurus construction in theory and practice, including: the formation of vocabularies; construction of a thesaurus; systems of indexing; effects of systems upon information retrieval; style and format of abstracts; evaluation of abstracting services; and requirements of users of abstracts. The design and construction of index languages/thesauri and analysis and evaluation of existing index languages/thesauri. Discussion of currently available indexing software packages.

LBSC786 Library and Archives Preservation (3 Credits)
An introduction to library and archives materials and media, the risks that affect their preservation and strategies used to enhance preservation of library and archives collections. The course reviews preservation knowledge and skills that archival and library staff uses when providing access, managing, processing and working with collections.

LBSC789 Special Topics in Contemporary Archives (3 Credits)
Issues in administering contemporary archives and records management programs. Topics are selected by individual instructors. For course content information please contact the College of Information Studies.