Course Description

Creating Information Infrastructures introduces students to the foundations of acquiring and managing collections, information structures, indexing and discovery systems in Library and Information Sciences. In the LIS degree program, this course covers the core technical and computer skills needed for library work.

The course introduces theoretical concepts, trends, systems, and technologies central to this area of the field and equips students with the skills and conceptual background to create and manage information systems and services. The course is centered on the exploration of library and archival information systems, with students working to create, index, and produce their own objects and descriptive metadata for physical and digital contexts. In order to introduce students to the broad world of information institutions, how they manage resources and provide access for their users the course is broken into four thematic areas:

- Terms of reference: What are information institutions, and in what social context do they exist?
- Get it: What kinds of resources do information institutions manage, and how do they come to have them?
- Find it: How do institutions manage these resources, what conceptual and functional skills are required for this work, and what benefits and limitations exist for each approach (e.g., automated vs. manual)?
- Serve it: How do information institutions provide access to these resources in physical and Web-based settings?

A central goal of the course is to develop student proficiency that will support their graduate work in the remaining core and elective classes.
Learning Outcomes
After successfully completing this course you will be able to:
Demonstrate mastery of concepts, models and information structures for life-cycle
- Demonstrate mastery of concepts, models, and information structures for life-cycle management of information assets by libraries, archives, and schools.
- Demonstrate knowledge of the capabilities and limitations of current methods for acquisition, preservation, management, discovery and delivery of information in physical and digital form.
- Demonstrate proficiency in creating and applying models, schema, representations and encodings for organizing information.
- Demonstrate proficiency in designing and implementing information services that leverage current technologies.
- Demonstrate familiarity with the effects of current trends in information creation, information technology, and information use on methods for acquisition, preservation, organization, management, discovery, and delivery of information.

Required Resources
Course website: elms.umd.edu

Erik Mitchell’s Metadata standards and web services in libraries, archives, and museums (Libraries Unlimited, 2015). This text is freely available via the UMD ebook collections:
https://umaryland.on.worldcat.org/oclc/922581516

Python Tutorial - available free online:
https://www.codecademy.com/learn/learn-python-3

To notify me you had an excused absence, email me as promptly as possible. Work missed for excused absences may be made up for full credit.
Campus Policies

It is our shared responsibility to know and abide by the University of Maryland’s policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit [go.umd.edu/ug-policy](http://go.umd.edu/ug-policy) for the Office of Undergraduate Studies’ full list of campus-wide policies and follow up with me if you have questions.

Accessibility and Learning Support

Students with disabilities should inform me of their needs at the beginning of the semester.

Please also contact the Accessibility and Disability Support Office (http://www.counseling.umd.edu/ADS/). ADS will make arrangements with the student and me to determine and implement appropriate academic accommodations. Inclusion is one of the iSchool's core values, and we have attempted to make all materials and assignments accessible to people with varying abilities. However, if there is something else I can do to make the class more accessible please schedule a time to come talk to me. This will benefit not only yourself but also future students!

Get Some Help!

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [tutoring.umd.edu](http://tutoring.umd.edu) to learn more about the wide range of campus resources available to you.

In particular, even though all UMD students are either native English speakers or have passed the TOEFL, it is normal to struggle to grasp the tone and style expected in advanced professional
writing and speaking. The best resource on campus to help with this is the Graduate Writing Center: https://gradschool.umd.edu/graduate-school-writing-center

Finally, if you just need someone to talk to, visit counseling.umd.edu.

Everything is free because you have already paid for it, and everyone needs help… all you have to do is ask for it.

Student Health and Time Management

For your own health and sanity, please stick to the hours of daylight for as much of your work for this class as possible. If you have to turn in an assignment late, I would rather you go to sleep and submit it at lunch time the next day than stay up late and get it in at 3:30 am. Your grade is the same either way and YOU DESERVE TO SLEEP.

Furthermore, DO NOT COME TO CLASS IF YOU ARE ILL. This is VITAL because your instructor is unusually susceptible to illness. Additionally, you will recover much faster if you get your rest and you will avoid exposing your classmates and teacher to infection. As this class meets once a week, you may miss non-consecutive classes with a self-signed sick notice emailed to me within 48 hours of missing class. For consecutive classes, a doctor’s note will be required. The only exceptions are the midterm and final presentation days which require a doctor’s note regardless of duration of illness. There is no limit to the total number of absences that may be excused via official doctor’s notes, allowing you to make up all missed work without late penalties.
Course-Specific Policies

For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Student.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Grades

Grades are not given, but earned. Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is important to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

If you feel you are struggling at any point in the course, on an individual assignment or topic or with getting work completed in general, please TALK TO ME as soon as possible so we can come up with a plan to help you do better.
All scores as well as comments and feedback (except on Midterms and Final Presentations) will be posted on ELMS. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet in my office.

Unless you have reported an excused absence to me in advance of the due date, late work will be subject to a markdown of 10% per day late so please plan to have it submitted well before the scheduled deadline. I am happy to discuss any of your grades with you, and if I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

### Assignments and Grading

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Date Due</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Reflection Paper #1</td>
<td>09/16/19</td>
<td>5</td>
</tr>
<tr>
<td>Reflection Paper #2</td>
<td>09/23/19</td>
<td>5</td>
</tr>
<tr>
<td>Reflection Paper #3</td>
<td>10/07/19</td>
<td>5</td>
</tr>
<tr>
<td>Reflection Paper #4</td>
<td>10/21/19</td>
<td>5</td>
</tr>
<tr>
<td>Final Project Proposal</td>
<td>10/28/19</td>
<td>1</td>
</tr>
<tr>
<td>Reflection Paper #5</td>
<td>11/04/19</td>
<td>5</td>
</tr>
<tr>
<td>Final Project Checkpoint</td>
<td>11/11/19</td>
<td>1</td>
</tr>
<tr>
<td>Reflection Paper #6</td>
<td>11/18/19</td>
<td>5</td>
</tr>
<tr>
<td>Final Project (Complete)</td>
<td>11/25/19</td>
<td>15</td>
</tr>
<tr>
<td>Cumulative Reflection Paper</td>
<td>12/09/19</td>
<td>15</td>
</tr>
<tr>
<td>Programming Assignment</td>
<td>12/02/19</td>
<td>10</td>
</tr>
<tr>
<td>Participation</td>
<td></td>
<td>28</td>
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</tbody>
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Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

### Final Grade Cutoffs
Course Schedule

8/26 - Module 1 – Information Infrastructures and Institutions

Introduce the structure for the semester grounded in a broad orientation to how information institutions work. Explore definitions and examples of information institutions including libraries, archives, and museums (LAMs). Explore the roles that these institutions play in society (e.g. memory, community, education, commerce).

Readings:


Watch: “What happens when you click a link.” https://www.youtube.com/watch?v=keo0dglCj7I#t=47

* Note: To receive an A+ you must have demonstrated significant contributions to the class in addition to achieving this numeric grade.
Optional Readings:

https://www.si.edu/content/gwc/bestofbothworldssmithsonian.pdf


http://muse.jhu.edu.proxy-um.researchport.umd.edu/article/535728

9/9 - Module 2 – Information Systems as Boundary Objects

Expand on the organizational orientation from Module 1 and discuss social and cultural roles of LAMs. Explore concrete examples of information, cultural heritage and memory institutions and define concepts and ideas to give students a holistic understanding of “information infrastructure” field.

Readings:


“My We Really Need Libraries?” – Linton Weeks for NPR in May 2015.
http://www.npr.org/sections/npr-history-dept/2015/05/05/403529103/do-we-really-need-libraries

Explore: DCC Digital Curation Lifecycle Model: http://www.dcc.ac.uk/resources/curation-lifecycle-model

Explore: Records and Information Life Cycle Management: https://www.bac-lac.gc.ca/eng/services/government-information-resources/lifecycle-management/Pages/lifecycle-management.aspx
Optional Readings:


Bohyun Kim’s blog post on “Suzanne Briet’s Document Antelope in Celebration of Ada Lovelace Day”. http://www.bohyunkim.net/blog/archives/2622#.WZhm8ih97IU

9/16 - Module 3 – Acquiring and Managing Resources

Explore resource acquisition and management work in LAMs. Introduce technical service and illustrate connections with other functional areas in information institutions by reinforcing role of core courses. For each LAMs institution type explore the notion of resource operations in light of changing information institution models. At the end of the class students will understand the role of each of the activities in LAMs 1) Publication models (formal, in-formal), 2) Acquisition of materials (published, manuscripts, grey literature), 3) Management of formats (physical and digital), 4) Materials processing and management, 5) Appraisal, access and preservation, 6) Alternative acquisition, management and dissemination strategies.

Readings:


[Read Introduction, Literature review, Skim remainder of the article]
Cynthia K. Sauer, Doing the Best We Can? The Use of Collection Development Policies and Cooperative Collecting Activities at Manuscript Repositories, American Archivist 64(2)308-349, 2001. https://doi.org/10.17723/aarc.64.2.gj6771215231xm37

Also:

Begin Codeacademy tutorial (Python or Javascript) - IMPORTANT: this assignment will take at least 20-24 hours to complete so please plan to spend at least two hours per week all semester working on it - waiting until the last minute on this assignment will NOT work!

9/23 - Module 4 – Introduction to Metadata

Introduce metadata model (cataloging model, metadata schema, data representation model, data encoding/serialization). Discuss different types of metadata (e.g. descriptive, administrative, technical) and situate metadata within the broader context of information system design.

Readings:


[Read/skim sections 1-5]

[Read/Skim]
Optional Readings:


9/30 - Module 5 – Methods of Description, Representation and Classification

Discuss cataloging methods and different forms of metadata in information institutions. Introduce concepts of metadata schemas and the role that metadata standards play in enabling creation of digital documents and representations. Reinforce specific cataloging standards/approaches (e.g., RDA and DACS) and introduce metadata schema (e.g., MARC, DC, EAD). Reinforce context of these standards in broader metadata and information system design models. Draw connections to other information systems. Explore and application classifications structures.

Readings:


Optional Readings:


Introduction to the Dewey Decimal Classification:
http://www.oclc.org/content/dam/oclc/dewey/versions/print/intro.pdf
Library of Congress Classification Outline: https://www.loc.gov/catdir/cpso/lcco/
Understanding MARC (Bibliographic MAchine Readable Cataloging): https://www.loc.gov/marc/umb/
BIBFRAME 2.0: https://www.loc.gov/bibframe/docs/bibframe2-model.html

10/7 - Module 6 – Metadata Schema, Vocabularies, and Encoding

Expand on concepts in metadata schema including the notion of application profiles, abstract models and Resource Description Framework. Broaden student understanding of vocabularies by introducing new serialization standards (e.g. XML, JSON).

Readings:


After reading the above, watch: https://www.youtube.com/watch?v=AbzOLua2baw
Optional Readings:
Dublin Core Metadata Initiative Abstract Model: http://dublincore.org/documents/abstract-model/


10/14 - Module 7 – Database Design

Introduce relational database design concepts and techniques. Reframe student understanding of information systems by introducing web-based information system design (e.g. Model – View – Controller). Topics covered include entity relationship modeling, database creation, database querying and information filtering.

Readings:


Optional Readings:
W3Schools (2013). Introduction to SQL. http://www.w3schools.com/sql/sql_intro.asp
10/21 - Module 8 – Deep Dive into Final Projects and Programming Assignment

Student exploration of their final project topics and working on the Programming Assignment if you haven’t yet.

Readings:
The readings this week are whatever you need to read as you explore your potential final projects.

10/28 - Module 9 – Search and Retrieval in Information Systems

Explore methods for automatic indexing and ranking of information resources. Introduce foundation of web search techniques, full text searching of scanned books and image searching.

Readings:

Watch: Google’s “How Search Works”: https://www.youtube.com/watch?v=BNHR6IQJGZs

Watch: Google’s “The Evolution of Search”: https://www.youtube.com/watch?v=mTBShTwCnD4

Explore: Google’s “Inside Search”:

Optional Readings:

Explore: http://www.wikidata.org/wiki/Wikidata:Main_Page


11/4 - Module 10 – Resource Dissemination, Access, and Use

Explore services that support access to physical and digital objects. Introduce broad types of information services including user-focused services (library catalog) and system-focused web-services (interoperability, harvesting, transformation) (ONIX, OAI/PMH).

Readings:


Optional Readings:

Lagoze, Carl and Herbert Van de Sompel. (2001). The Open Archives Initiative: Building a low-

11/11 - Module 11 – Metadata-rich Web Services

Continue exploring metadata rich web services.

Readings:


Explore: http://linkeddatatools.com/


11/18 - Module 12 – Building Blocks of the Web

Revisit web-publishing document standards (e.g. HTML, CSS, JavaScript). Acquaint students at a high level with web publishing approaches.
Readings:

How to Publish Web Pages Using Your TerpConnect Account: https://umd.service-now.com/itsc?id=kb_article&sys_id=78160fe33790020041271f9543990e57


Optional Readings:


Watch: Uploading Files to Terconnect with WinSCP: https://www.youtube.com/watch?v=3uLLKveCJec

12/2 - Module 13 – Exploration of Data Management

In this class we are exploring the broad area of Research Data Management in order to better understand how issues of organization and information technology have an impact in an emerging area of interest in libraries, archives, schools and museums. Students will explore a real-world data management guide and try their hand at data management tools.

Readings:
Read: Data Science/Data Scientist Definitions. https://drive.google.com/a/berkeley.edu/file/d/0B210UXTUO1YdbkFmTzZ2dWZBTms/edit?usp=sharing


12/9 - Module 14 – Next Steps in Information Infrastructures

Expand on concepts in metadata schema including the notion of application profiles, abstract models (e.g. Dublin Core Abstract Model) and Resource Description Framework. Broaden student understanding of vocabularies by introducing new serialization standards (e.g. XML, JSON).

Readings:


Assignment Details

Course Participation
Points given for attendance and meaningful participation in discussions on the readings, lectures, related issues and events, etc.

**Reflection Papers**

6 biweekly papers worth 5 points each (30 points total) and 1 Cumulative Reflection Paper (worth 15 points)

Every other week you will be asked to reflect on your work through the course. The biweekly Reflection Papers should be approximately 1 page (1” margins, single-spaced, 12-point font).

Prompts for each paper will be provided, but you are always welcome to discuss anything else relevant to the modules covered by the reflection paper (e.g., the readings, the activity worksheets, course discussions, etc.).

Your Cumulative Reflection paper should be approximately 3 pages (1” margins, single-spaced, 12-point font) and should look back on the entirety of the course.

All papers will be submitted by ELMS upload.

Grading Guidelines:

Papers will be evaluated on general clarity and coherence and well as your ability to demonstrate a synthesis of the course materials.

**Course Final Project**

(Project Selection and Project Update are worth 1 point each (2 total). Final deliverable is worth 15 points).

Please select ONE capstone project to complete. Although the specific project can be selected by you and does not need to absolutely fit one of the projects below, it should meet or exceed the elements of one of the suggested projects.
All projects will be prefaced by two check-in assignments. The Project Selection assignment will be a short survey in ELMS where you indicate which project you will be working on and its scope. The Project Update will be a short paragraph that you will upload to ELMS.

**Option 1 – Research paper**

Your research paper may touch on your experiences in the course or may be informed by an external interest you have related to information infrastructures (e.g., resources, technologies, standards, lifecycles, communities). Ultimately you should use your paper to explore issues of information infrastructure trends and in libraries, archives, schools and museums in depth and include and original literature review/analysis and original thought. The paper should include 5 academic sources that were not part of the regular course readings and should be at least 10 double spaced pages long (with 1” margins and a 12-point font). It may be helpful to break your paper into four sections (Introduction/Problem statement, Literature review, Analysis/discussion, Conclusion). APA Style and Formatting is preferred.

Deliverables:
- Project Selection
- Project Update
- A 10+ page paper (double spaced) uploaded to ELMS.

Grading Guidelines:
- Paper meets 8-page length and minimum 5 source requirements.
- Paper explores issues of information infrastructure trends and in libraries, archives, schools and museums in depth and includes original literature review/analysis and original thought.
- Paper is well written and connects resources cited to original ideas.

**Option 2 – Create your own website**

Leveraging the HTML and CSS skills learned in this class, create a website. You should create a website with a specific purpose in mind. For example, you may want to create a website that shows off photos from a trip you took, showcases recipes and pictures of dishes you create or serves as a personal/professional homepage.

The website should consist of at least 3 separate pages, employ use of content (e.g. headers, paragraph content, links to internal and external sites), media (e.g. images, embedded media, linked videos), and have a focused use case and platform (e.g., my user is someone who wants to view recipes on their mobile phone). The website should employ semantic/xhtml techniques as
Creating Information Infrastructures

outlined in our course documents, use CSS for styling and may make use of JavaScript or other advanced technologies if desired (note: JavaScript is optional). The use of template-based layout sites like Wix.com or sites.google.com are not acceptable for this assignment. Information on setting up your TerpConnect Account and web accessibility can be found under Module 12.

Deliverables:
• Project Selection
• Project Update
• URL to the website you created
• A 1-2 paged paper or short video describing the project and reflecting on your experience.

Grading Guidelines:
Website:
• Consists of at least 3 separate pages.
• Employs use of content (e.g., headers, links to other sites).
• Employs use of media.
• Demonstrates a focused use case and platform.

Paper or video:
• Discusses all relevant features of the website.
• Reflects on the use case for the website.
• Reflects on the process of building the website.

Option 3 – Digital Library Evaluation

You will draw on what you have learned in this course regarding information system, the management of information objects, and metadata in order to investigate and evaluate two or more digital libraries produced by LAMs. You can select your digital libraries based on type of LAM (e.g., both are from museums), subject area (e.g., materials relating to local history), materials presented (e.g., still images, texts, streaming media), software platform used (e.g. ContentDM, Omeka, or ViewShare) or other theme that you can describe in your introduction. If a digital library is made up of several collections.

Ideally you should select digital libraries that have shared a copy of their data dictionary or the metadata schema that supports the digital library. Many grant-funded digital libraries will share the data dictionary as part of their requirements and others share them as part of best practices. Often, you can reach out to the creators of the digital library and ask for a copy or a version. For example, all of the digital collections created by the University of Washington have
their data dictionaries posted separately, while others may post it in an area of the digital library that describes the collections etc.

The data dictionary or schema will help you better understand the choices, standards, and vocabularies being used in the collection, as they’re not as readily apparent as in something like a MARC catalog. If you would like my assistance tracking down or contacting someone for their data dictionary or schema, please let me know. However, if you feel you can glean enough about the digital library without the data dictionary, you may omit this step. I just find them to be useful.

You should spend time in each digital library – browsing, searching, navigating, downloading (if possible) etc. Your evaluation of the digital libraries should discuss the following topics:

- Can you identify which system is being used?
- Who are the intended users of this digital library?
- What kinds of information objects are being preserved/shared?
- What can you learn about the information objects in the digital library? What do you wish you knew?
- Describe the searching process. Are you able to find what you want easily?
- Describe the browsing process? Does the digital library leverage controlled vocabularies?
- What works in this digital library?
- What do you find challenging or what would you change to make this digital library work better?
- How do your digital libraries compare to each other?

You can either organize your digital library evaluation by theme (e.g., “Searching”) or describe each individually and then draw connection in a conclusion at the end.

Deliverables:
- Project Selection
- Project Update
- A 8+ page (double spaced) evaluation of two or more digital libraries uploaded to ELMS

Grading Guidelines:
- Evaluation meets 8-page length and two or more digital libraries requirement
- Evaluation demonstrates time spent exploring the digital library itself.
- Evaluation touches on the evaluation topics enumerated above.
- Evaluation is well-written and draws connections between the digital libraries and the larger themes and readings in the course.
**Option 4 – Practical Experience**

You may, in cooperation with a local LAM (through an internship or volunteer agreement), submit documentation of work done to catalogue and prepare new acquisitions for service OR to prepare a digital collection for public use. To ensure an appropriate scope, your project must include:

For cataloging physical materials (both): Inventory and Assessment, Cataloguing of materials/records
For digitization projects (at least two of the following stages of the digitization cycle): inventory and assessment, quality control and post processing, description and cataloging or metadata creation, web publication.

**Deliverables:**
- Project Selection
- Project Update
- A 4+ page paper (double spaced) uploaded to ELMS describing your work
- Documentation of work including copies of catalog records or metadata created

**Grading Guidelines:**
- Paper meets length and minimum 5 source requirements.
- Paper explores issues of information infrastructure trends and in libraries, archives, schools and museums in depth and includes original literature review/analysis and original thought.
- Paper is well written and connects resources cited to original ideas.

**Programming Exploration:**

(Due at the end of the course, but may be handed in at any time. Worth 10 points.)

In this assignment students learn more about programming and data manipulation using Python or JavaScript. This assignment is largely self-led and involves completing either the Python (recommended) or JavaScript Codeacademy course as well as a reflective statement about the process.

[NOTE: If you have already completed this Codeacademy course prior to class or if you know Python and JavaScript you should choose another programming activity at Codeacademy or somewhere similar. Please clear this with me prior to working on it.]

**Instructions:**
- Go to https://www.codecademy.com/learn/learn-python
- https://www.codecademy.com/learn/learn-javascript
• Create an account.
• Complete the course (10-13 hours of work).

Deliverables:
• Screenshot of your Course Completion Survey (or screenshot showing percentage of the course completed). You can upload this as a separate file or paste the screenshot into a document with your reflective statement.
• Short reflective statement on the process. Statement should be about a paragraph or two and discuss your experience undertaking this assignment.

Grading Guidelines:
• Course completion (Up to 6 points)
  o 33% complete = 2 point
  o 66% complete = 4 points
  o 100% complete = 6 points
• Reflective statement (4 points)

Acknowledgements

The overarching structure of this course is drawn from a previous versions designed by Erik Mitchell and and Maggie Dull

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.