Course  HCOL 185
Title  Information Through the Ages: Cave Paintings to Big Data
Instructor  Dr. Jeff Frolik, School of Engineering
Time  Tuesdays, 4:00 pm – 6:45 pm
Location  UHTN23 034F

Description

Over the past few decades, networked computing has evolved from closed institutional use to today’s open and pervasive Internet. This period of history has thus, in some camps, been called the Information Age. But what is information? How has technology related to information impacted society and vice-versa? This course will explore these questions through an investigation of the history of information. Beginning with the earliest known examples (e.g., cave paintings and petroglyphs), we will identify the key attributes of information. The impact of making information mobile through writing and printing will then be explored. Building on these foundational tenets, the historical significance of major milestones in telecommunications (i.e., the near instantaneous exchange of information over a distance) will find context. Finally, the course will focus on the digital representation of information and will cover topics such as compression, security, big data, and the cloud.

Objectives

- Students will become familiar with the fundamental tenets of information
- Students will be able to discuss key points in history where the means of transferring information underwent disruptive change
- Students will be able to provide examples where society was changed by information and vice versa
- Students will be able to apply the mathematical underpinnings of information theory
- Students will be able to create both source and error correction codes for arbitrary data sets
- Students will be able to develop and present a project of their own design that includes a written, oral, video, and experimental component.

Tentative Schedule

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<th>Week</th>
<th>Day</th>
<th>Subject</th>
<th>Assignment</th>
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<td>8/26</td>
<td>Information – Basic Tenets</td>
<td>Data Collection</td>
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<td>2</td>
<td>9/2</td>
<td>Symbols as Information</td>
<td>Essay 1</td>
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<td>3</td>
<td>9/9</td>
<td>The Written Word</td>
<td>Quiz 1</td>
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<td>4</td>
<td>9/16</td>
<td>The Printed Word</td>
<td>Image Collection 1</td>
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<td>5</td>
<td>9/23</td>
<td>Origins of Telecommunications</td>
<td>Essay 2 / Project Title</td>
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<td>6</td>
<td>9/30</td>
<td>The Golden Age of Wireless</td>
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<td>10/7</td>
<td>The Rise of the Computer</td>
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<td>10/14</td>
<td>Presentation 1: The Pre-Digital Age</td>
<td>Essay 4 / Project Abstract</td>
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<td>10/28</td>
<td>Fundamentals of Information Theory</td>
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<td>Source Coding: Reducing the Bits</td>
<td>Quiz 3 / Project Report Draft</td>
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<td>Encryption &amp; Error Correction: Protecting the Bits</td>
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<td>11/18</td>
<td>Big Data &amp; The Cloud</td>
<td>Quiz 5 / Revised Project Report</td>
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<td>14</td>
<td>12/2</td>
<td>Presentation 2: The Digital Age</td>
<td>Essay 6</td>
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<td>FINAL</td>
<td>12/9</td>
<td>Project “Presentations”</td>
<td>Final Project</td>
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Methods of Evaluation

15 % - Quizzes, Essays, Image Collections
15 % - Essays
15 % - Image Collections
15 % - Presentation 1: The Pre-Digital Age
15 % - Presentation 2: The Digital Age
25 % - Project

Quizzes: Quizzes are designed to assess comprehension of material covered. These will typically be 'quantitative' problems that need to be worked out using the methods discussed in class.

Essays: Given a prompt, students will provide a nominal response of about 1000 words. Essays will be scored on a rubric consisting of completeness of response, spelling/grammar, referencing, etc. Students will have one week to write the essay once the prompt is provided.

Image Collections: Students will be provided a topic/question for which they will pull together a collection of 10 images. In addition, students will provide for each image a 100-word description as to how this particular image relates to the topic. In groups and then as a class, students will form a full collection that will then be made available for public viewing.

Presentations: Students will work in teams of two (or three) to present on a topic of their choosing related to information in both the pre-digital age and in the digital age.

Project: Students will work in teams of two (or three) on a project of their own choosing (provided the topic is approved). The project will consist of an experiment conducted by the student team, data analysis, a written report, a demonstration, and an oral presentation.

List of Reading Materials

Required Texts

Tentative Journal Articles

Various
- Patents pertaining to key inventions
- Videos related to course content
- Recent articles provided by instructor
- Articles independently identified by students
Statement Regarding Essential Honors College Qualities

The course, *Information Through the Ages: Cave Paintings to Big Data*, will embody several of the “Essential Qualities” sought in an Honors College sophomore seminar course. The topic of “Information” will be viewed in this course through historical, social, technical and quantitative lenses. This *multidisciplinary* approach to the subject will enable the instructor to tie the course content to other subjects germane to the HC students’ majors.

The expectation is that the course will be highly *interactive*. Each week a particular discussion topic will be addressed. Students will be assigned a reading in advance related to that topic but will also be required to research and present arguments from other resources. In class, students will work in small groups to discuss and summarize their findings that will then be presented to and discussed by the class as a whole. The student groups will change for each assignment so students will be exposed to a variety of perspectives throughout the semester. Essays will undergo peer review prior to submittal further providing opportunities for student discourse. While foundational material will be presented by the instructor, it is viewed that his role will be primarily as facilitator for the class work.

The course will also be *research oriented*. Students will (1) find their own resources related to the weekly discussion topics, (2) collect material for two presentations, and (3) conduct a student defined research project. The first presentation will be related to information and society prior to the digital revolution and the second will pertain to current trends in information. The final project will require the students to formalize a research topic, conduct the requisite literature review, distill their findings, etc. This project will also require students to develop and conduct an experiment or simulation, analyze and present data, and draw conclusions. Finally, the project will also have a component where the students may choose an additional *creative* means present their research results. These means may include live demonstrations, videos, or a class participation exercise. The instructor will invite library staff to the class so that they can introduce the variety of relevant services available to the students.

The course will be *writing intensive*. There will be multiple essays assigned throughout the semester along with a written component for each presentation. For the final project, students will develop a report in the format of the academic journals most directly related to their chosen discipline thereby providing experience in developing effective abstracts, creating a bibliography, etc. The project will have deliverables throughout the semester allowing time for students to revise/improve their work. Not all writings will be lengthy. For example, students will develop two image collections during the course. Each collection will consist of five images that they view best represent the discussion topic. For each image, students will provide a concise and persuasive caption as to the importance of the captured subject. It is hoped that these image collections will make their way to various display monitors across campus.

The course is expected to be *academically challenging*. It will leverage a student’s written and discourse aptitudes and their quantitative reasoning. In regards to the latter, students will need to have working knowledge of fundamental probability and algebra concepts (although these will be reviewed).