The minor in Digital Studies of Language, Culture, and History introduces students to computer programming and the use of cutting-edge software tools for representing, exploring, analyzing, and publishing the products of human language and culture. These products range from everyday speech and writing to historical documents and literary texts, and they encompass music and art as well as mundane objects, places, and institutions. The courses in this minor will help students not just to understand and use digital tools but to see digital computing as a cultural activity in its own right—an activity to be studied with respect to its historical development, social setting, cultural impact, and aesthetic qualities, as well as the ethical problems it creates in our increasingly digitized and networked world. This minor does not require a background in mathematics or computing but is designed for students who are majoring in the humanities or humanistic social sciences. It will also be of interest to students majoring in the sciences who want to acquire programming skills in the context of linguistic, cultural, and historical studies.

MINOR IN DIGITAL STUDIES OF LANGUAGE, CULTURE, AND HISTORY

Students must take six courses to complete the minor in Digital Studies of Language, Culture, and History. They break down as follows:

1. **One course that provides a broad survey of computing in the humanities**: DIGS 20007 Introduction to Digital Humanities, which is offered annually in the Autumn Quarter.

2. **One course in computer programming.** Either Digs 20001 Introduction to Computer Programming, which is offered annually in the Autumn Quarter; or Digs 10000 Approaches to Digital Humanities Using Python, a remote-only course taught during the Summer Session; or one of the following courses offered by the Department of Computer Science: CMSC 12100 Computer Science with Applications I, CMSC 15100 Introduction to Computer Science I, or CMSC 16100 Honors Introduction to Computer Science I. Note that students who take CMSC 15100 or CMSC 16100 are expected to learn the Python language on their own.

3. **One course in data analysis**: Either STAT 22000 Statistical Methods and Applications, which is offered every quarter, or Digs 20002 Data Analysis for the Humanities I, which is offered annually in the Autumn Quarter. Note that STAT 20000 Elementary Statistics does not fulfill this requirement, although STAT courses that are more advanced than STAT 22000 would do so.

4. **One course in data management**: DIGS 20003 Data Management for the Humanities, which is offered annually in the Winter Quarter.

5. **One of the following courses**:
   - DIGS 20004 Data Analysis for the Humanities II (Winter)
   - DIGS 20005 Data Publication for the Humanities (Spring)
   - DIGS 20006 Data Analysis for the Humanities III: Deep Learning (Spring)
   - DIGS 20031 Digital Texts I: Opening New Paths for Textual Scholarship (Winter)
   - DIGS 20032 Digital Texts II (Spring; not offered every year)

   Note that Digs 20004, Digs 20005, and Digs 20006 each have as a prerequisite Digs 20001 or an equivalent introduction to computer programming. Note that Digs 20004 and Digs 20006 also have as a prerequisite Digs 20002 or an equivalent introduction to statistics.

   Note that students who have taken courses in computer programming and/or statistics to fulfill the requirements of their major(s) or other minor(s), or to fulfill the general education requirements, cannot double-count those courses to reduce the number of courses required for the Digital Studies minor. In that case, they will take additional Digs courses from the list above in lieu of Digs 20001 and/or Digs 20002.

6. **One elective course** in the humanities or humanistic social sciences that has a digital component, broadly defined, and has been approved by the Director of Digital Studies. Students who wish to use their elective slot to do their own digital project and create a software product for their portfolio may do so by means of a Digs independent study course that will count as their elective.

   Note that the particular courses on offer will vary from year to year and some courses may have prerequisites. Examples of potentially suitable courses include:
   - CMST 25204 Media Ecology: Embodiment & Software
   - CMST 27110 Digital Cinema
   - CMST 27815 Introduction to Art, Technology, and Media
   - CMST 27920 Virtual Reality Production
ENGL 25980 Technorelations: Intimacy, Bodies, Machines  
ENGL 25990 Always Already New - Printed Books & Electronic Texts  
GEOG 20500 Introduction to Spatial Data Science  
GEOG 28201 Intro to Geographic Information Systems  
HIPS 25205 Computers, Minds, Intelligence & Data  
HIST 25415 History of Information  
HIST 25425 Censorship, Info Control, & Revolutions in Info Technology from the Printing Press to the Internet  
HIST 29523 Data History: Information Overload from the Enlightenment to Google  
LING 28600 Computational Linguistics  
MUSI 26618 Electronic Music: Composing with Sound

**Summary of Requirements for the Minor**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>DIGS 20001</td>
<td>Introduction to Computer Programming</td>
<td>100</td>
</tr>
<tr>
<td>or DIGS 10000</td>
<td>Approaches to Digital Humanities Using Python</td>
<td></td>
</tr>
<tr>
<td>or CMSC 12100</td>
<td>Computer Science with Applications I</td>
<td></td>
</tr>
<tr>
<td>or CMSC 15100</td>
<td>Introduction to Computer Science I</td>
<td></td>
</tr>
<tr>
<td>or CMSC 16100</td>
<td>Honors Introduction to Computer Science I</td>
<td></td>
</tr>
<tr>
<td>DIGS 20002</td>
<td>Data Analysis for the Humanities I</td>
<td>100</td>
</tr>
<tr>
<td>or STAT 22000</td>
<td>Statistical Methods and Applications</td>
<td></td>
</tr>
<tr>
<td>DIGS 20003</td>
<td>Data Management for the Humanities</td>
<td>100</td>
</tr>
<tr>
<td>DIGS 20004</td>
<td>Data Analysis for the Humanities II</td>
<td>100</td>
</tr>
<tr>
<td>or DIGS 20005</td>
<td>Data Publication for the Humanities</td>
<td></td>
</tr>
<tr>
<td>or DIGS 20006</td>
<td>Data Analysis for the Humanities III: Deep Learning</td>
<td></td>
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<tr>
<td>or DIGS 20031</td>
<td>Digital Texts I: Opening New Paths for Textual Scholarship</td>
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<tr>
<td>or DIGS 20032</td>
<td>Digital Texts II</td>
<td></td>
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<tr>
<td>DIGS 20007</td>
<td>Introduction to Digital Humanities</td>
<td>100</td>
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<tr>
<td>One elective, approved by the faculty director</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total Units</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

**Advising and Grading**

Courses in the minor may not be double counted with the student’s major(s), other minors, or general education requirements. Courses in the minor must be taken for quality grades, and more than half of the requirements for the minor must be met by registering for courses bearing University of Chicago course numbers.

Students who elect the minor must meet with the academic director before the end of Spring Quarter of their third year to declare their intention to complete the minor. The director’s approval for the minor program should be submitted to a student’s College adviser by the deadline above using the Consent to Complete a Minor Program (https://humanities-web.s3.us-east-2.amazonaws.com/college-prod/s3fs-public/documents/Consent_Minor_Program.pdf) form.

**Digital Studies of Language, Culture, and History Courses**

**DIGS 10000. Approaches to Digital Humanities Using Python. 100 Units.**

This course introduces students to (1) current work in digital humanities with examples of the software applications being used and the computational research being done in literary, historical, linguistic, and cultural studies; and (2) the principles and practices of computer programming using the Python programming language. (Taught remotely via Zoom in the Summer Session; undergraduate only.)

Instructor(s): Clovis Gladstone Terms Offered: Summer

**DIGS 20001. Introduction to Computer Programming. 100 Units.**

This course provides an introduction to computer programming and computational concepts using the Python programming language. It is a prerequisite for many of the other Digital Studies core courses (students who are already experts in Python may request an exemption from taking this course, subject to the approval of the Director of Digital Studies). The textbook for this course is Think Python (second edition) by Allen B. Downey, which is available online, free of charge.

Instructor(s): Clovis Gladstone Terms Offered: Autumn

Equivalent Course(s): DIGS 30001

**DIGS 20002. Data Analysis for the Humanities I. 100 Units.**

This course provides an introduction to statistics and computational data analysis. Topics covered include probability, distributions, and statistical inference, as well as linear regression and logistic regression. Students will learn how to use Python libraries for statistics and plotting within Jupyter Notebooks. The textbook for this course is OpenIntro Statistics, which is available online, free of charge. Students who have taken the University of
Chicago course STAT 22000 or an equivalent statistics course may request an exemption from taking this course, subject to the approval of the Director of Digital Studies.

Terms Offered: Autumn
Equivalent Course(s): DIGS 30002

DINGS 20003. Data Management for the Humanities. 100 Units.
This course introduces concepts and techniques related to the representation and management of digital data, with emphasis on the forms of data encountered in the humanities. Topics covered include: (1) digital text encoding using the Unicode and XML standards, with attention to the TEI-XML tagging scheme of the Text Encoding Initiative; (2) digital typefaces ("fonts") for displaying encoded characters; (3) digital encoding of 2D images, 3D models, sound, and video; (4) database models and querying languages (especially SQL for relational databases and SPARQL for non-relational RDF-graph databases), with attention to methods for integrating and querying the kinds of semi-structured and heterogeneous data characteristic of the humanities; (5) ontologies, the Semantic Web, and related technical standards; and (6) cartographic concepts (e.g., coordinate systems and map projections) and the basics of geospatial data management using Geographic Information Systems. This course has no prerequisite; i.e., prior knowledge of computer programming is not required.

Terms Offered: Autumn
Prerequisite(s): DIGS 20001/30000/30001, “Introduction to Computer Programming” (or an equivalent course in computer programming)
Equivalent Course(s): DIGS 30003

DINGS 20004. Data Analysis for the Humanities II. 100 Units.
This course builds on DINGS 20002/30002, "Data Analysis for the Humanities I," by introducing students to the R language and R packages for data analysis. Topics covered include data visualization, textual analysis, social network analysis, geospatial data analysis, and high-performance computing (HPC) techniques for analyzing large datasets. The goal is to make students familiar with these methods and aware of their role in linguistic, cultural, and historical studies, as a basis for further study of these methods.

Terms Offered: Winter
Prerequisite(s): DIGS 20001/30000/30001, “Introduction to Computer Programming” (or an equivalent course in computer programming) and DIGS 20002/30002, “Data Analysis for the Humanities I” (or an equivalent statistics course)
Equivalent Course(s): DIGS 30004

DINGS 20005. Data Publication for the Humanities. 100 Units.
This course introduces software techniques and tools for building Web browser apps written in HTML5, CSS, and JavaScript with emphasis on user interfaces for presenting information to researchers and students in the humanities. Topics covered include: (1) the use of application programming interfaces (APIs) to integrate into Web apps the various analysis, visualization, and database services provided by external systems; (2) the transformation of data into formats appropriate for publication on the Web; and (3) the use of persistent identifiers for reliable citation of published data and the problems of archiving and preserving scholarly data.

Terms Offered: Winter
Prerequisite(s): DIGS 20001/30000/30001, “Introduction to Computer Programming” (or an equivalent course in computer programming)
Equivalent Course(s): DIGS 30005

DINGS 20006. Data Analysis for the Humanities III: Deep Learning. 100 Units.
This course focuses on applications of deep neural networks and machine learning (“deep learning”) in the humanities. Topics covered include AI-assisted natural language processing (NLP) and machine translation, audio analysis (e.g., speech recognition and musical analysis), image analysis (computer vision), and the philosophical issues raised by artificial intelligence and especially non-symbolic (second-wave) AI based on deep learning.

Terms Offered: Spring
Prerequisite(s): DIGS 20001/30001, “Introduction to Computer Programming” (or an equivalent course in computer programming), and DIGS 20002/30002, “Data Analysis for the Humanities I” (or an equivalent course in statistics).
Equivalent Course(s): DIGS 30006

DINGS 20007. Introduction to Digital Humanities. 100 Units.
This course surveys the history and theory of digital computing, the use of computers in the humanities, and recent debates in digital humanities. Topics discussed include the impact of digital media in modern culture, the philosophical questions raised by artificial intelligence (AI), and the ethical dilemmas created by the pervasive use of software. This course has no prerequisite; i.e., prior knowledge of computer programming is not required.

Instructor(s): David Schloen
Terms Offered: Autumn
Equivalent Course(s): DIGS 30007

DINGS 20031. Digital Texts I: Opening New Paths for Textual Scholarship. 100 Units.
The purpose of this course is to introduce students in the humanities to digital methodologies for the study of text. Students will not only learn how to construct a digital text collection, but also how to process text as data. Among the various digital approaches which will be introduced in class are concordances (retrieving occurrences of words), semantic similarity detection (finding similar passages across texts), sentiment analysis, or stylometry
Digital Studies of Language, Culture, and History

(analysis of literary style). The course will highlight how these approaches to text can provide new avenues of research, such as tracing intellectual influence over the longue durée, or uncovering the distinguishing stylistic features of an author, work, or literary movement. Students need no prior knowledge of such methods, and the course will aim at providing both the basics of computer programming in Python and to give students the necessary tooling to conduct a digital humanities project. The source material for the course will be drawn from literary sources, and students will be free (and encouraged) to use texts which are relevant to their own research interests. Students will need to bring a laptop to class.

Instructor(s): Gladstone, Clovis
Terms Offered: Winter
Equivalent Course(s): DIGS 30031, RLLT 34550, RLLT 24550

DIGS 20032. Digital Texts II. 100 Units.
This course is designed to expose students who already have experience in Python programming and text processing to more advanced computational approaches to text analysis. Over the course of the quarter, students will learn how to leverage existing Python libraries to extract the morphological structure from texts, they will become adept at building, analyzing, and refining their own machine-learning models using a variety of preprocessing and feature engineering methods. We will be covering clustering methods such as topic modeling, as well as different supervised learning or word embedding approaches. Our class content will be supplemented by readings which highlight the uses of these computational methods in current academic research. The source material for the course will be drawn from literary and/or media resources, and students will be free (and encouraged) to use texts which are relevant to their own research interests. At the end of the course, students will be expected to produce their own digital project using some of the methods covered in class. Students will need to bring a laptop to class.

Instructor(s): Gladstone, Clovis
Terms Offered: Spring
Prerequisite(s): DIGS 20031/30031: Digital Texts I DIGS 20001/30001: Intro to Computer Programming (or an equivalent course)
Note(s): Prerequisites may be waived by permission of the instructor for students who have sufficient background in the subject.
Equivalent Course(s): RLLT 30032, DIGS 30032, RLLT 20032

DIGS 23517. Introduction to Critical Spatial Media: Visualizing Urban, Environmental, and Planetary Change. 100 Units.
This course introduces critical theories and techniques for visualizing interconnected transformations of urban, environmental, and planetary systems amidst the pressures of climate change, urbanization, and global economies of capitalism. Weekly lectures will introduce major themes and theoretical debates, paired with hands-on lab tutorials exploring a selection of methods in conventional and experimental geographic visualization. Thematically, the course will be organized around critical interpretations of the Anthropocene, a concept designating the epoch in which anthropogenic activities are recognized as the dominant force of planetary climatic and ecological change. We will present these interpretations through modules structured around different conceptual paradigms and alternative epochal designations (e.g. the Urbanocene, the Capitalocene, the Plantationocene). Through weekly lab exercises and a final, synthetic project, the course will move from critically analyzing prevalent theoretical frameworks, geospatial data, and associated visualization techniques to creatively visualizing critical alternatives. Students will learn how to construct visual narratives through a variety of spatial media (e.g. maps, diagrams, visual timelines), scales (e.g. bodies, neighborhoods, landscapes, the planetary), and techniques/platforms (e.g. GIS, web mapping, basic programming language tools, and vector/raster visualization programs).

Instructor(s): Alexander Arroyo, Grga
Terms Offered: Spring
Equivalent Course(s): ENST 23517, ARTV 20665, MAAD 13517, ARCH 23517