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 These products range from everyday speech and writing to historical documents and literary texts, and they encompass music and art as well as mundane objects, places, and institutions.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 in computer programming. Students are encouraged to take DIGS 20001 Introduction to Computer Programming, but the following are acceptable substitutes: CMSC 12100 Computer Science with Applications I, CMSC 15100 Introduction to Computer Science I, CMSC 16100 Honors Introduction to Computer Science I.

2. One course in statistics. Students are encouraged to take STAT 22000 Statistical Methods and Applications, which is offered every quarter. Alternatively, they may take DIGS 20002 Basic Mathematics and Statistics for the Humanities, which is offered in the Autumn Quarter.

3. One course in data analysis using the R programming environment: DIGS 20004 Data Analysis for the Humanities. This course has the prerequisites of DIGS 20001 and DIGS 20002 (or equivalent courses in computer programming and statistics).

4. One of the following three courses:
   - DIGS 20003 Data Management for the Humanities (Autumn)
   - DIGS 20005 Data Publication for the Humanities (Winter)
   - DIGS 20006 Natural Language Processing (Spring)

   Note that each of these courses has a prerequisite of DIGS 20001 (or an equivalent introduction to computer programming), and DIGS 20006 also requires DIGS 20002 (or an equivalent introduction to statistics).

5. A required seminar course: DIGS 20007 History and Theory of Digital Computing and Digital Humanities

6. One elective course approved by the faculty director of the Digital Studies of Language, Culture, and History program. This will normally be a course in the humanities or social sciences that entails computational methods or explores the history and cultural significance of digital media or of computation in general. Suitable courses are offered in several different departments and programs.

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 I

SUMMARY OF REQUIREMENTS FOR THE MINOR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>DIGS 20001</td>
<td>Introduction to Computer Programming</td>
<td>100</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>Basic Mathematics and Statistics for the Humanities</td>
<td>100</td>
</tr>
<tr>
<td>or STAT 22000</td>
<td>Statistical Methods and Applications</td>
<td></td>
</tr>
<tr>
<td>DIGS 20004</td>
<td>Data Analysis for the Humanities</td>
<td>100</td>
</tr>
<tr>
<td>One of the following three courses:</td>
<td></td>
<td>100</td>
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<tr>
<td>DIGS 20003</td>
<td>Data Management for the Humanities</td>
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<tr>
<td>or DIGS 20005</td>
<td>Data Publication for the Humanities</td>
<td></td>
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<tr>
<td>or DIGS 20006</td>
<td>Natural Language Processing</td>
<td></td>
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<tr>
<td>DIGS 20007</td>
<td>History and Theory of Digital Computing and Digital Humanities</td>
<td>100</td>
</tr>
<tr>
<td>One elective, approved by the faculty director</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>600</td>
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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 20001. Introduction to Computer Programming. 100 Units.

In this course, students will learn computer programming and computational concepts using the Python programming language. No prior background in computing is required. This course, or an equivalent introductory Computer Science course (CMSC 12100, 15100, or 16100), is a prerequisite for the other Digital Studies (DIGS) courses, with the exception of DIGS 20002/30002. This course is tailored for students in the humanities. DIGS 20001/30001 is offered every Spring and is open to all undergraduate and graduate students at the University, with priority given to those pursuing an undergraduate minor or BA/MA in Digital Studies. Note: Students in the Digital Studies MA program will not enroll in this course but will instead complete a three-week programming ‘boot camp’ in September, prior to the beginning of the Autumn Quarter. DIGS MA students may be exempted from this course requirement if they can demonstrate sufficient knowledge of computer programming, which will be determined in consultation with the faculty director of Digital Studies.

Terms Offered: Spring Summer. DIGS 20001/30001 is offered every Spring Quarter as a full-length course and in Summer as an intensive three-week course in the September term.

Note(s): This course is open to all undergraduate and graduate students at the University, with priority given to those pursuing an undergraduate minor or BA/MA in Digital Studies. Note: Students in the Digital Studies MA program will not enroll in this course but will instead enroll in the equivalent DIGS 30000 course, only offered as a three-week course in the September term, prior to the beginning of the Autumn Quarter. DIGS MA students may be exempted from this course requirement if they can demonstrate sufficient knowledge of computer programming, which will be determined in consultation with the faculty director of Digital Studies.

Equivalent Course(s): DIGS 30001
DIGS 20002. Basic Mathematics and Statistics for the Humanities. 100 Units.
This course covers selected topics in mathematics which are relevant for computing and for the subsequent Digital Studies courses, and it provides an introduction to statistics with emphasis on the analysis of linguistic, cultural, and historical data. No prior background in mathematics beyond the high school level is required for this course. For students who are, or who have been, UChicago undergraduates, STAT 22000 may be substituted for this course. Other prior courses in statistics may also be accepted in lieu of this course, subject to the approval of the faculty director of the Digital Studies program. This course (or an equivalent statistics course) is a prerequisite for DIGS 20004/30004 and DIGS 20006/30006. This course is offered in the Autumn.
Terms Offered: Autumn
Note(s): For students who are, or who have been, University of Chicago undergraduates, STAT 22000 may be substituted for this course. Other prior courses in statistics may also be accepted in lieu of this course, subject to the approval of the faculty director of the Digital Studies program. This course (or an equivalent statistics course) is a prerequisite for DIGS 20004/30004 and DIGS 20006/30006.
Equivalent Course(s): DIGS 30002

DIGS 20003. Data Management for the Humanities. 100 Units.
This course introduces students to concepts and techniques related to the representation and management of digital data, with emphasis on the forms of data encountered in linguistic, cultural, and historical research. The following topics are covered: (1) digital character encoding using the ASCII and Unicode standards and digital typefaces (‘fonts’) for displaying encoded characters; (2) the digital encoding of 2D images, 3D models, sound, and video; (3) database models and querying languages, both relational and non-relational, with attention to data-integration methods for combining and querying semi-structured and heterogeneous data; and (4) cartographic concepts (e.g., coordinate systems and map projections) and the basics of geospatial data management using Geographic Information Systems (GIS). DIGS 20001/30001, or an equivalent introduction to programming, is a prerequisite for this course. This course is offered in the Autumn.
Terms Offered: Autumn
Prerequisite(s): DIGS 20001/30001, or an equivalent introduction to programming
Equivalent Course(s): DIGS 30003

DIGS 20004. Data Analysis for the Humanities. 100 Units.
This course builds on the introduction to statistics in DIGS 20002/30002 by introducing students to the R language and R packages for data analysis. Topics covered include the basics of data mining, data visualization, and high-performance computing (HPC) techniques for analyzing large datasets. This course provides a high-level conceptual introduction to machine learning, social network analysis, and spatial data analysis. 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. DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents) are prerequisites for this course. This course is offered in the Autumn.
Terms Offered: Winter
Prerequisite(s): DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents)
Equivalent Course(s): DIGS 30004

DIGS 20005. Data Publication for the Humanities. 100 Units.
This course introduces software techniques and tools for building end-user-facing apps that run in Web browsers (via HTML5, CSS, and JavaScript). Students will learn how to use application programming interfaces (APIs) to integrate Web services into their apps, making use of the analysis, visualization, and database services provided by external systems. Attention will be paid to user-interface design for both research purposes and pedagogical purposes. Students will learn how to use GitHub to manage software development. DIGS 20001/30001, or an equivalent introduction to programming, is a prerequisite for this course. This course is offered in the Winter.
Terms Offered: Winter
Prerequisite(s): DIGS 20001/30001, or an equivalent introduction to programming
Equivalent Course(s): DIGS 30005

DIGS 20006. Natural Language Processing. 100 Units.
This course introduces software techniques and tools for natural language processing (NLP). The following topics are covered: (1) textual markup and related software standards such as the Extensible Markup Language (XML), as well as the Text Encoding Initiative’s XML tagging scheme; (2) character-string processing (with or without markup tags); and (3) NLP methods for part-of-speech tagging, lemmatization, morphological segmentation, sentence splitting, named entity recognition, co-reference resolution, sentiment analysis, and topic modeling. This course also provides a high-level conceptual overview of recent work in machine translation via neural networks and deep learning. DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents) are prerequisites for this course. This course is offered in the Spring.
Terms Offered: Spring
Prerequisite(s): DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents)
Equivalent Course(s): DIGS 30006
**DIGS 20007. History and Theory of Digital Computing and Digital Humanities. 100 Units.**

This is a discussion-oriented seminar that introduces students to theoretical debates in digital humanities, broadly defined, with attention to underlying philosophical issues. It touches upon the history and theory of digital computing within its social and institutional settings, as well as the history of the application of digital computing to texts, images, sound, geospatial data, and other information relevant to cultural and historical studies. Among other topics, this course introduces students to debates about the cultural impact of digital media and about ethical issues related to the ownership, accessibility, and legitimate uses of digital data. DIGS 20001/30001, or an equivalent introduction to programming, is a prerequisite for this course. This course is offered in the Autumn.

Terms Offered: Autumn  
Prerequisite(s): DIGS 20001/30001, or an equivalent introduction to programming  
Equivalent Course(s): DIGS 30007

**DIGS 20015. Musical Robotics. 100 Units.**

Musical Robotics is a skills and discussion-based class for students interested in learning analog and digital electronics to build robotic musical instruments or sound art installations. Discussions will be organized around readings related to art and technology with a special focus on sound-based works. Students will learn to program Arduinos to control DC motors, solenoids, and servos with music applications like Logic Pro and Max/MSP. As a final project students will present a new instrument they’ve created or plans for an art installation featuring a kinetic sculpture element.

Instructor(s): Bryan Jacobs  
Terms Offered: Autumn  
Prerequisite(s): For this advanced course, a background in low-level, functional, or graphical (Max/MSP, PD) computer programming is assumed. It is also assumed that students have done some work to develop musical ideas or worked towards developing an aesthetic perspective.  
Equivalent Course(s): MAAD 26720, MUSI 26720, DIGS 30015, MUSI 36620