Digital Studies of Language, Culture, and History

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 These products range from everyday speech and writing to historical documents and literary texts, and they encompass music and art as well as mundane objects, places, and institutions.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 seven 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 Intro To Computer Science-1, CMSC 16100 Honors Introduction to Computer Science I.

2. One course in statistics. Students are encouraged to take DIGS 20002 Basic Mathematics and Statistics for Digital Studies, but the following are acceptable substitutes: STAT 20000 Elementary Statistics, STAT 22000 Statistical Methods and Applications.

3. One course in data analysis using the R programming environment: DIGS 20004 Data Analysis for Linguistic, Cultural, and Historical Research. This course has the prerequisite of DIGS 20001 and DIGS 20002 (or equivalent courses in computer programming and statistics).

4. Two courses chosen from the following three courses. Note that each of these has as a prerequisite of DIGS 20001 (or an equivalent introduction to computer programming):
   - DIGS 20003 Data Management for Linguistic, Cultural, and Historical Research
   - DIGS 20005 Data Publication for Linguistic, Cultural, and Historical Research
   - DIGS 20006 Natural Language Processing

5. A required seminar course: DIGS 20007 Issues in Digital Studies of Language, Culture, and History

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

**DIGS 20001**  Introduction to Computer Programming  100
  or CMSC 12100  Computer Science with Applications I
  or CMSC 15100  Intro To Computer Science-1
  or CMSC 16100  Honors Introduction to Computer Science I

**DIGS 20002**  Basic Mathematics and Statistics for Digital Studies  100
  or STAT 20000  Elementary Statistics
  or STAT 22000  Statistical Methods and Applications

**DIGS 20004**  Data Analysis for Linguistic, Cultural, and Historical Research  100

Two of the following three courses:  200

**DIGS 20003**  Data Management for Linguistic, Cultural, and Historical Research

**DIGS 20005**  Data Publication for Linguistic, Cultural, and Historical Research

**DIGS 20006**  Natural Language Processing

**DIGS 20007**  Issues in Digital Studies of Language, Culture, and History  100

One elective, approved by the faculty director  100

Total Units  700

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 program 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 a form available from the adviser.

DIGITAL STUDIES OF LANGUAGE, CULTURE, AND HISTORY COURSES

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

In this course, students learn computer programming and computational concepts using the Python programming language. The Python programming exercises involve topics in mathematics and statistics covered in DIGS 20002/30002 and are designed to reinforce comprehension of those topics; thus it is recommended that DIGS 20001/30001 and DIGS 20002/30002 be taken in the same quarter, if possible. No prior background in computing is required for this course. For students who are, or who have been, UChicago undergraduates, the following Computer Science courses may be substituted for this course: CMSC 12100, CMSC 15100, or CMSC 16100. This course (or an equivalent CMSC programming course) is a prerequisite for the other Digital Studies courses, with the exception of DIGS 20002/30002, which has no prerequisite. However, students in the M.A. program in Digital Studies or in the undergraduate minor in Digital Studies can be exempted from this course requirement if they pass an examination designed to test their knowledge of computer programming. Such students will instead take an additional elective course to fulfill their Digital Studies program requirements. This course is offered in Summer 2018 and thereafter will be offered in both Spring and Summer each year.

**Terms Offered:** Spring Summer

**Equivalent Course(s):** DIGS 30001

**DIGS 20002. Basic Mathematics and Statistics for Digital Studies. 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. Comprehension of these topics is reinforced by the Python programming exercises in DIGS 20001/30001; thus it is recommended that DIGS 20001/30001 and DIGS 20002/30002 be taken in the same quarter, if possible. 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, the following Statistics courses may be substituted for this course: STAT 20000 or STAT 22000. 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 Summer 2018 and thereafter will be offered in both Spring and Summer each year.

**Terms Offered:** Spring Summer

**Equivalent Course(s):** DIGS 30002
DIGS 20003. Data Management for Linguistic, Cultural, and Historical Research. 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 Linguistic, Cultural, and Historical Research. 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: Autumn
Prerequisite(s): DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents)
Equivalent Course(s): DIGS 30004

DIGS 20005. Data Publication for Linguistic, Cultural, and Historical Research. 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. Prerequisites for this course include DIGS 20001/30001 and DIGS
20002/30002 (or their equivalents), and also DIGS 20003/30003 and DIGS 20004/30004. This course is offered in the
Winter.

Terms Offered: Winter
Prerequisite(s): DIGS 20001/30001 and DIGS 20002/30002 (or their equivalents), DIGS 20003/30003, and DIGS
20004/30004
Equivalent Course(s): DIGS 30006

DIGS 20007. Issues in Digital Studies of Language, Culture, and History. 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 Winter.

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