DIGITAL HERITAGE DOCUMENTATION:
GIS, BUILDING SURVEYING AND DATA MANAGEMENT
TENTATIVE SYLLABUS

Spring 2025 | Columbia University | GSAPP | HP | A 6414
301 Fayerweather or Schermerhorn Hall, Room 655 (Preservation Technology Lab) | Instructor: Bilge Kose | bk2539@columbia.edu

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COURSE DESCRIPTION

Overview

Heritage places are complex areas characterized by intricate spatial relations. Effective preservation, planning and management of these sites require a systematic approach to deriving, storing, structuring, analyzing and presenting spatial data. A robust heritage recording and information management system plays a vital role in ensuring a sustainable future of these sites. The course **"**Digital Heritage Documentation: GIS, Building Surveying and Data Management" is designed to provide comprehensive knowledge of various techniques and tools for heritage recording and information management. It also focuses on transforming complex data into engaging narratives for targeted audiences through digital storytelling.

The course is structured around two core components. The first focuses on the digital documentation and information management of heritage places on site and urban scales and transforming complex data to a more accessible format via compelling narratives. This parts includes an introduction to **Geographical Information Systems (GIS),** a critical tool for storing, processing, analyzing and presenting complex spatial data. The data, collected from diverse sources such as field surveys, open data, archival materials, and literature, is further disseminated through **interactive story maps**.

The second core focuses into the documentation and management of heritage places at the site and building scales. This part covers various building surveying and recording techniques, including **photogrammetry, 3D laser scanning with LiDAR** and **conventional techniques**.

Methods of Instruction

Throughout the course, the students will have the opportunity to gain both theoretical knowledge and hands-on experience in the digital heritage documentation processes via lectures, site

surveys, and lab exercises. The students will build and enhance their skills in integrated heritage recording, documentation, information management, presentation and dissemination processes across different scales. Additionally students will gain practical experience with various surveying equipment and software including **ArcGIS Pro, ArcGIS Online, ArcGIS StoryMaps, Faro Focus laser scanner, Faro Scene and Reality Capture. No prior experience with the software or equipment is required, as the course will be tailored to accommodate each student's skillsets.**

The class is designed around project-based learning, incorporating both individual and team-based work. The classes and assignments are structured to facilitate completion of these projects throughout the semester.

The class meets once a week in 301 Fayerweather or Preservation Technology Lab at Schermerhorn Room 655. Please refer to course announcements for specific location updates. The course consists of lectures, hands-on software exercises, and a field survey. Lectures will cover systematic approaches to heritage documentation and explore the possibilities offered by various techniques in heritage documentation and information management. Through hands-on exercises, students will develop and expand their skills using different computer software applications. During the field survey, students will gain practical experience with building surveying techniques, including photogrammetry, 3D laser scanning, and traditional methods.

Student Learning Outcomes

The course aims to provide students with knowledge about the basics of the digital heritage documentation across various scales and equip them with both theoretical and technical skills necessary for engaging in the processes of surveying, recording, information management, presentation, and digital storytelling of heritage sites.

Students who successfully complete the course will:

► be able to participate in integrated heritage recording, documentation, monitoring, information management, and presentation processes at different scales.

► gain foundational knowledge and hands-on experience with Geographic Information Systems (GIS).

► Acquire basic knowledge and practical experience in recording and documenting heritage sites using photogrammetry, LiDAR laser scanning, and traditional techniques

► learn to create interactive, communicative maps and use them to craft compelling narratives through digital storytelling.
►be able to identify different methods, tools, and techniques in heritage documentation processes

EVALUATION, TENTATIVE COURSE OUTLINE and GRADING

Assignments

The students are required to complete three major assignments throughout the course, in addition to weekly tasks that will support the completion of these assignments. These assignments are designed to provide opportunities for critical discussion and analysis of the tools and workflows used in digital heritage documentation. They will also help you manage, visualize, and disseminate the data you are working with. First-year HP students are encouraged to align their projects with their work in HP Studio II.

Assignment 1 | GIS and Digital Storytelling

In this assignment, students will develop a GIS data management project focused on a heritage site in urban scale. Key tasks include designing a GIS database, creating maps, and disseminating collected information through storytelling on the ArcGIS StoryMaps platform. Milestones for this assignment include: creating base maps, designing the project's logical structure, collecting raw data, transferring it into GIS, structuring the data according to your database design, conducting data analysis and queries, uploading data to ArcGIS Online, and designing your StoryMap. Students will work individually or in groups at different stages of the assignment.

Assignment 2 | Architectural Heritage Recording

Students will survey, record, and document a heritage site or building. This will involve a field survey where data is gathered through photogrammetry and 3D laser scanning. The collected data will then be processed to create digital 3D models, orthoimages, 2D measured drawings, and material/deterioration maps.

Assignment 3 | Research Assignment

For this assignment, students will research a case study in which digital technologies have been used for heritage surveying and documentation. They will critically analyze the case and present their findings, comparing them to their own experiences throughout the course.

Weekly Tasks/ Assignments:

Weekly assignments are designed to help students to successfully complete Assignments 1 (GIS and Digital Storytelling) and 2 (Architectural Heritage Recording), while tracking individual progress. Each weekly task will serve as a milestone toward completing the major assignments and will be a prerequisite for the next one. Students will receive feedback on Assignments 1 and 2 through these weekly tasks, so completing them on time and incorporating feedback before the final submission is crucial for success. Weekly assignments will be posted on Canvas each week.

Deliverables, Deadlines & Grades

	Deliverables	***Points***	
Assignment 1 | GIS and Digital Storytelling	GIS Weekly Assignment 1	2	
	GIS Weekly Assignment 2	2	
	GIS Weekly Assignment 3	4	
	GIS Weekly Assignment 4	4	
	GIS Weekly Assignment 5	3	**45**
	Mid-Review Presentation	5	
	Final Review Presentation	15	
	Submission	10	
Assignment 2 | Architectural Heritage Documentation	AHR Weekly Assignment 1	5	
	AHR Weekly Assignment 2	5	
	AHR Weekly Assignment 3	5	**40**
	Final Review Presentation	15	
	Submission	10	
Assignment 3 | Research Project	Final Review Presentation Paper Submission	5 5	**10**
Attendance &Participation			**5**
			100

Tentative Course Outline]

WEEK 01 | GIS and Digital Storytelling	> Introduction to the course > Introduction to GIS in Historic Preservation > Georeferencing historical maps > Disseminating Data I: Sharing project files

WEEK 02 | GIS and Digital Storytelling	> Data Inputs I : Open data and joining, cleaning, organizing data > Visualisation of Data I: Classifying data and Symbology > Database Design: Logical Map to Digital Map
WEEK 03 | GIS and Digital Storytelling	> Data inputs II : Creating and editing vector data and attribute tables > Dissemination of Data II: Adding metadata > Visualisation of Data II: Designing map outputs
WEEK 04 | GIS and Digital Storytelling	> Data Analysis and query in ArcGIS I : SQL, field calculator and exporting data > Deciding the research topics and groups for Assignment 3
WEEK 05 | GIS and Digital Storytelling	> Data Analysis and query in ArcGIS II: SQL, field calculator and exporting data
WEEK 06 | GIS and Digital Storytelling	> ArcGIS online and Story Maps I > Feedbacks and discussion on research topics for Assignment 3
WEEK 07 | GIS and Digital Storytelling	> ArcGIS online and Story Maps II
WEEK 08 | MID REVIEWS	> Mid Review of GIS and Digital Storytelling Assignment (Assignment 1 > Final Presentations of Research Assignment (Assignment 3)
SPRING BREAK	
WEEK 09 | Architectural Heritage Documentation	>Architectural Heritage Documentation, Part I: Introduction to Photogrammetry, 3D Laser Scanners and Traditional Techniques > Introduction to Conditions Documentation: Material and Deterioration Mapping
WEEK 09, Saturday | Architectural Heritage Documentation Field Survey	
WEEK 10 | Architectural Heritage Documentation	> Architectural Heritage Documentation, Part II: Processing Photogrammetry Data, Guest Lecturer, TBD
WEEK 11 | Architectural Heritage Documentation	> Architectural Heritage Documentation, Part III: Processing LiDAR Data, Guest Lecturer, TBD
WEEK 12 | Architectural Heritage Documentation	> Digitizing conditions documentation > Q&A and feedbacks
WEEK 13 | FINAL REVIEWS	> Final Review | GIS and Digital Storytelling Assignment (Assignment 1) > Final Review | Architectural Heritage Documentation (Assignment 2)
WEEK 14	> Discussion, Q&A and final feedbacks before final submission