Course Title

Augmenting the Gallery

Augmented Reality in Exhibition Spaces

Course Number
IMNY-UT 9001D01

Instruction Mode: In-Person

Fall 2022

Lecturer Contact Information
Pierre Depaz (he/him)

Your instructor will inform you about learner hours (one-on-one meetings).

Prerequisites
None

Units Earned
4

Course Details
Time: Wednesday, 9:30am - 1:00pm

Location: Rooms will be posted in Albert before your first class.

In the interest of protecting the NYU Berlin community, we are closely following guidance around COVID-19 from the Robert Koch Institute (Germany’s institute for disease control and prevention), the Centers for Disease Control and Prevention (CDC), the World Health Organization, and the New York City Department of Health and Mental Hygiene and adjusting our recommendations and policies accordingly. Your health and well-being is our top priority. You are required to adhere to the most recent policies. Please note that you are expected to attend every class meeting in-person; however, this may change at any point during the semester if local COVID-19 regulations so require. You will be assigned a seat on the first day and are expected to use that seat for the entire semester due to NYU COVID-19 safety protocol.
Course Description
Wall labels, audio guides, and informative maps are just some of the ways by which galleries and museums convey information and hidden narratives about a collection. Given the changing role of museums and galleries in the 21st century, how can we utilize new tools such as Augmented Reality (AR) to design and deliver immersive experiences that breathe new life into an exhibit? How can such tools do so without distracting from the power and importance of a collection, or by purposefully challenging problematic aspects such as an exhibit’s disputed provenance or ethical concerns? And how can these tools make collections more accessible to a wider audience?
This course mobilizes resources from museography, art history, sociology, interaction design and 3D, real-time development to answer these questions. Topics covered include exhibition installation and curation, mixed reality production in Unity, and mobile development for Augmented Reality. The course is open to students from a variety of academic backgrounds interested in gaining hands-on experience in applying new technologies to exhibition spaces.

Course Learning Outcomes (CLOs)
- Understand the theoretical concepts and practical challenges of curating and exhibiting artworks in 21st century museum and gallery spaces.
- Understand the development workflow in the Unity game engine for AR applications.
- Apply best-practices in user-interface design and information delivery on mobile platforms.
- Evaluate the advantages and disadvantages of augmenting technologies within cultural spaces.
- Create relevant mobile digital content within a given exhibition through prototyping, iteration and integration.
- Gain insights into how professional exhibitors work and the innovations they are considering, by working on use cases with museums and galleries in Berlin.
- Become aware of skills and experiences which can be offered to potential future employers in the museum and gallery world.

Course Approach to Teaching & Learning (CATL)
This course focuses on a hands-on approach to theoretical issues in curation and exhibition. In this regard, learning by doing is given a preferential approach, both through design and development. During class, topics explored on a theoretical level will then be prototyped through practical implementation. Each week includes both a theoretical discussion on a given topic, as well as technical content aimed at developing familiarity with the software used in this class (Unity). Each week’s technical content will build on the previous week’s in order to form a single assignment by the mid-semester. Additionally, in order to accommodate a spectrum of technical expertise and abilities among students, further platforms for prototyping (Figma, Adobe XD) are introduced, which will enable students to complete the exercises.
Regarding class participation, the working assumption is that critical feedback is the highest form of respect. Thus, you are encouraged to comment on your classmates’ work when they present it, and encouraged to ask for feedback from your classmates when you present yours.
Students have the opportunity to work with partner institutions in order to design and develop an AR project based on a professional use case.

Assessment Components
Technical projects - 25%. You will complete a series of short technical projects in order to develop familiarity with the Unity engine and AR workflow. Each assignment builds on the
previous one, ensuring that students master each skill at each level. Students are expected to present their projects at each step in class for a group review.

**Participation** - 20%. Participation includes (a) in-class discussion of readings and of your classmates’ project presentations, (b) completion of all homework assignments, (c) posting your weekly reading responses online, and (d) contributing to the class resources — whether by finding current exhibitions and cultural events, or innovative AR projects not mentioned during class, and sharing them with your instructor and classmates.

**Collection activation** - 25%. Due mid-semester - You will design a digital project proposal for a large-scale institution’s collection, by applying your knowledge of both applied application design and broad affordances of augmentation as seen in class. Your report should include background research on the gallery/museum and the artist(s) exhibited, analysis of the curatorial intent, the practical installation and description of the audience, and conclude with a proposal for augmenting that specific exhibition. You will submit a PDF of your proposal to your instructor.

**Museum project** - 30%. Due end of semester - You will complete a longer project, which will be developed throughout the semester in collaboration with our museum partners. This group project will include (a) a pre-emptive analysis of the site and collection that you will be working with, (b) design and development of the AR, and (c) a presentation to the partner teams with user-testing and post-production conclusions on the effectiveness and limitations of the application. A detailed grading rubric will be provided on the class website.

**Note:** All homework and reading responses are due by the time class starts. All readings are expected to be completed for the week they are listed, unless stated otherwise.

Students are expected to attend class in person. Failure to submit or fulfill any required component may result in failure of the class, regardless of grades achieved in other assignments.

**Required Text(s)**
All required readings will be provided as a digital copy on the course website.

Please follow this link for the [NYU Berlin Library Catalogue](https://www.nyu.edu) or the link on NYU Berlin's website (Academics/Facilities & Services).

**Session 1 – 7 September 2022 – Introduction**
This session first covers housekeeping matters, introduces the course materials, learning objectives and technological tools. The second part introduces students to the changing landscape of museum institutions in the 21st century, as well as to the current state of technology in mixed and augmented reality. We will also ask questions about the relationship between the digital and the physical. How does technology augment the spaces, objects, and persons that it is applied to? How is storytelling, education and learning being changed by digital technologies?

**Learning Outcomes:** Technical fluency: develop a basic, functioning mobile application using the Unity Engine and the Augmented Reality toolkits. Understand the challenges at hand when developing AR applications. Understand the current state of museology in the 21st century.

**Technical:**
Introduction to Unity
GameObject / Component / Script model
Introduction to C#

Homework (due next session): Choose an object as a 3D model that belongs to a specific group (the interpretation of “group” is up to you—it could be a place, a moment, an activity, a group of people, etc.). Import the type of object into Unity and position them so that it is easily visible from the camera.

Session 2 – 14 September 2022 – Augmenting Technologies
This session introduces students to the development workflow of Unity, the main software we will be using for class. The starting point for this will be the history and principles of Mixed and Augmented Reality.
Learning Outcomes: Technical fluency: develop a basic, functioning mobile application using the Unity Engine and the Augmented Reality toolkits. Design awareness: understand how to structure an application around the principles of human-computer interaction and user-centered design.

Watch:
- Pierre’s recorded lectures

Reading:

Lecture:
- History and principles of Mixed and Augmented Reality.
- Introduction to ARKit/ARCore and setting up a development environment.

Technical:
- Canvas and UI in Unity.

Homework (due next session): Develop an AR application that allows your user to interact with digital objects, following the production, mediation, consumption model seen in class. Use the objects you have worked with so far. You should implement an input for your user and UI components to provide feedback and information.

Session 3 – 21 September 2022 – Unity and Interaction Design
This week takes a step back from the hands-on development in Unity, in order to look at some essential design concepts, such as user-experience, affordance, user story and information interfaces. What is interface design? What is interaction design? What is UX design? We will discuss the specificities and interconnections of all of these approaches in the context of AR, as well as practical methods for implementing them.
Learning Outcomes: Design awareness: Design an application around the principles of human-computer interaction and user-centered design. Construct a narrative thread in a digital interactive environment.

Reading:

Lecture:
- Interaction Design
- Storytelling in the digital age - UX and UI

Technical:
- Adobe XD
- Intro to ARFoundation

Due – Technical Project 1 – Object stories

Session 4 – 28 September 2022 – Museums and Utopia
What should museums represent? The world as it was? The world as it could be? What relationship does a museum establish between what is and what could be? This week looks at museums as “extra-real” spaces, offering alternative worldviews and paradigms, focusing on the presentation of work-in-progress and feedback-oriented discussions regarding your current progress.

Learning Outcomes: Curatorial awareness: explain the ideas and intent behind the organization, layout and presentation of a given body of work. Transdisciplinarity: analyze the issue at hand from the lens of technology and media studies as well as museum studies.

Reading:

Technical:
- Interacting with an object in AR
- Physics in Unity
- Scene Management

Homework (due next session): Finish the build exercise started in class on your own device. Convert your assignment #1 for AR!

Session 5 – 5 October 2022 – The Role of Museums
This session focuses on analyzing and exploring the role of museums as historical and cultural institutions. Why do museums exist? Why do people go to museums? Have museums evolved over time? In which direction? The second part of the session is dedicated to working time on the students’ projects.

Learning Outcomes: Understand the historical component of the ideas and intent behind the organization, layout and presentation of a given body of work. Analyze the evolution of the role of the museum in the 21st century. Envision what possible futures lie ahead for museum institutions.
Looking at the museum, the museum, its objects, and its technologies.

**Technical Session**
- Interacting with an object in AR – 2
- Raycasting
- Touch interactions

**Due – Technical Project 2 – Object stories in AR**

**Session 6 – 12 October 2022 – Augmenting Objects**
This week focuses on the idea and the reality of what an “object” is. What are some of the visible properties of an object? What are the invisible ones? If objects also symbolize things beyond themselves, how can we use AR and digital technology to bring those aspects to the forefront?

**Learning Outcomes:** Curatorial awareness: understand the ideas and intent behind the organization, layout and presentation of a given collection of objects. Design awareness: understand how to structure information in the digital world around a given object. Define what constitutes an object based on the production/distribution/consumption framework.

**Reading:**

**Lecture:**
- The object, the art-object and the display.
- Objects in anthropology

**Homework (due next session):** Complete your ARKit application by adding different scenes and more thorough background research.

**Technical:**
- ARKit programming 2
- Plane detection
- Image Markers

**Session 7 – 19 October 2022 – Presentations by Museum Partners**
This week will mark the beginning of our collaboration with our museum partners, as well as the start of our reflection on specific museum or gallery partners. Partners will come to present use cases in class, and we will form groups to work on these use cases.

**Learning Outcomes:** Real-world implementation: propose and implement a design around a given constraint (i.e., that of a real-world exhibition). Analyze a professional client presentation and identify the main action points to be addressed in the deliverable.
Session 8 – 26 October 2022 – Museums and Information in Physical Spaces
This week focuses on laying out the current use of digital media (not limited to AR), ranging from audio guides, to interactive display tables, VR installations and companion applications. We examine how museums are making the most of digital media, while also addressing the limitations of this approach. The second part of the lecture will focus on how to organize brainstormed ideas into a design document for your museum partner development project.

Learning Outcomes: Curatorial awareness: understand the ideas and intent behind the organization, layout and presentation of a given body of work. Design awareness: understand how to structure an application around the principles of human-computer interaction and user-centered design. Transdisciplinarity: analyze the issue at hand from the lens of technology and media studies as well as museum studies. Technical skill: learn and use contemporary wireframing tools to convey your ideas.

Reading:
- N/A

Homework (due next session): Start to think about which museum use case you would like to work on.

Lecture:
- The different spaces of a museum
- Guides in museums
- Walking and orientations

Technical:
- Unity Collab

Session 9 – 2 November 2022 – Museums and Information in Online Spaces
This week we explore how museums engage in technology that is exclusively online. Whether through social media, online access of physical collections or online exploration of non-accessible collections, the internet has changed the way we consider accessibility and information.

Learning Outcomes: Curatorial awareness: understand the ideas and intent behind the organization, layout and presentation of a given body of work. Design awareness: understand how to structure an application around the principles of human-computer interaction and user-centered design. Analyze the evolution of the role of the museum in the 21st century. Transdisciplinarity: analyze the issue at hand through the lens of technology and media studies as well as museum studies.

Reading:

Homework (due next week):
- Complete a first version of your design document.
- Get in touch with the contact person at the partner museum or gallery regarding your project. Discuss your idea with them and see how they can help (assets, examples, code, reports, visitor studies, etc.).
- Come prepared to present what project you've decided to work on for the museum partnership.

Lecture:
- Online information organization
- The virtual museum
- The museum beyond its walls

Technical:
- Unity Animations
- Unity APIs - 1

Due – Technical Project 3 – Full AR app

Session 10 – 9 November 2022 – Museum and Education
This week we investigate the educational role of museums, focusing on inclusiveness and design for (dis)abilities. The lecture will highlight how it relates to both physical spaces, in the case of cultural institutions, and digital spaces, in the case of application design and development.

**Learning Outcomes:** Understand the educational and pedagogical approaches behind the organization, layout, presentation of a collection. Evaluate how human-computer interaction and user-centered design are used to pedagogical ends. Analyze the evolution of the role of the museum in the 21st century.

Reading:

Homework (due next session): Finish your design document for your museum use-case.


Technical:
- Start developing your museum project.
- Spatial Unity with geolocalization and compass

Due – Design Document
Session 11 – 16 November 2022 – Augmenting Art Galleries
This session introduces students to the principles and practices of curating a show for an art
gallery. What do curators do? How do they select artists? How do they organize a show
spatially and theoretically by taking into account technical requirements, artistic intent and
expected audiences? Why put up a show in the first place? The second part of this session is
dedicated to student work.
Learning Outcomes: Curatorial awareness: evaluate the role of art galleries in relation to the
role of museums in both the art market and society at large. Real-world implementation:
propose and implement a design around a given constraint (i.e., that of a real-world exhibition).
Execute the best practices in media development and project planning.

Reading:
- N/A

Homework (due next session): Establish a retro-planning for your project, breaking down
the next four weeks day by day, and post it on your blog (you can link to a google spreadsheet,
for instance).

Lecture: The history and role of the art gallery. Digital media as an integral part of the
exhibition process.

Technical:
- Work session on your museum projects
- Unity PlayerPrefs

Session 12 – 23 November 2022 – Exhibiting Digital Artworks
While an increasing number of artworks include a software component, the question of how to
present and preserve them has proven to be complicated. How is the exhibition of a piece of
software art faithful to its original intent and situation?
Learning Outcomes: Curatorial awareness: understand the ideas, intent and challenges of
curation and preservation in the specific context of new media art. Design awareness:
understand how to structure an application around the principles of human-computer
interaction and user-centered design.

Reading:
- Presenting and Preserving New Media, Christiane Paul in Digital Art, Thames and
- Objects, Intent, and Authenticity: Producing, Selling, and Conserving Media Art, Caitlin
  Jones, in New Collecting: Exhibiting and Audiences after New Media Art, Routledge,
  2016.

Homework: Write an update regarding your Collection Activation assignment (what further
research have you done, what wireframes have you made, etc.)

Lecture: Exhibition and preservation of digital artworks.

Work and catch-up session on Unity. Introduction to Adobe InDesign and visual layout and
communication.
Session 13 – 30 November 2022 – Reflection Session
Students will take part in a discussion about the pros and cons of the use of technology in general, and how they relate to accessibility and inclusivity and of AR specifically, within the context of museums.

**Learning Outcomes:** Real-world implementation: propose and implement a design around a given constraint (i.e., that of a real-world exhibition). Technical fluency: develop a basic, functioning mobile application using the Unity Engine and the Augmented Reality toolkits.

**Reading:**
- N/A

**Lecture:** N/A

**Technical:**
- This session is dedicated to in-class work time in expectation of the presentation next week.
- Add the final touches to the development of your project. You are welcome to arrange an individual appointment with your instructor for specific advice and debugging. Finalize your presentation for the museum/gallery partners and include a short presentation and video of the application running on your device.

Session 14 – 07 December 2022 – Final Presentations
Students will be presenting their final projects to the museum partners.

The second part of the class will be dedicated to class wrap-up and feedback.

This session concludes the semester by summing up some of the key developments in the interaction between portable digital technology and museum institutions, as well as providing some directions going forward (developing museum web platforms, using Virtual Reality or archiving objects through photogrammetry). How does AR influence our relation to the art-object? How do museums find their place in a digital world? The end of the session is dedicated to course evaluations.

**Recommendations for a Positive Teaching and Learning Environment**
Laptops are allowed during lab times and programming tutorials, but should be put to sleep during lectures and class discussions. Exceptions will be made for students with academic accommodations from the Moses Center.

**Suggested Learning Opportunities that Relate to our Course**
You are strongly encouraged to visit museums and galleries wherever you are based, as long as the current local health and safety guidelines permit doing so. Recommendations for museums and galleries in Berlin will be listed on the class website, but feel free to add to that list by editing the wiki. The museum and gallery scene in Berlin is an incredibly diverse array of curatorial projects, materials, histories, and approaches.

**Your Lecturer**
Pierre Depaz is an educator, artist, and programmer from France. Having taught at NYU New York and Abu Dhabi, he is currently a Lecturer at NYU Berlin and Sciences Po. Pierre is interested in the multiple ways computers are attempting to represent and interface with human
concepts and emotions. His academic research revolves around simulation, semantics and public organization through technological means. His artistic practice includes digital games, computer simulations, interactive installations, networked performances and experimental web projects, which have been exhibited in NYC, Paris, Cairo, Abu Dhabi, Brussels, and Berlin. His teaching philosophy is influenced by Jacques Rancière’s analysis of Joseph Jactotot’s Universal Method, developed in *The Ignorant Schoolmaster*, which assumes the radical equality of all minds.

**Academic Policies**

**Grade Conversion**
Your lecturer may use one of the following scales of numerical equivalents to letter grades:

- A = 94-100 or 4.0
- A- = 90-93 or 3.7
- B+ = 87-89 or 3.3
- B = 84-86 or 3.0
- B- = 80-83 or 2.7
- C+ = 77-79 or 2.3
- C = 74-76 or 2.0
- C- = 70-73 or 1.7
- D+ = 67-69 or 1.3
- D = 65-66 or 1.0
- F = below 65 or 0

**Attendance Policy**

Studying at Global Academic Centers is an academically intensive and immersive experience, in which students from a wide range of backgrounds exchange ideas in discussion-based seminars. Learning in such an environment depends on the active participation of all students. Since classes typically meet once or twice a week, even a single absence can cause a student to miss a significant portion of a course. To ensure the integrity of this academic experience, class attendance at the centers is expected promptly when class begins. Attendance will be checked at each class meeting.

As soon as it becomes clear that you cannot attend a class, you must inform your professor and/or the Academics team (berlin.academics@nyu.edu) by e-mail immediately (i.e. before the start of your class). Absences are only excused if they are due to illness, Moses Center accommodations, religious observance or emergencies. Your professor or site staff may ask you to present a doctor’s note or an exceptional permission from an NYU Staff member as proof. Emergencies or other exceptional circumstances that you wish to be treated confidentially must be presented to NYU Berlin’s director or Wellness Counselor. Doctor’s notes must be submitted in person or by e-mail to the Academics team, who will inform your professors.

Unexcused absences may be penalized with a two percent deduction from the student’s final course grade for every week’s worth of classes missed, and may negatively affect your class participation grade. Four unexcused absences in one course may lead to a Fail in that course. Being more than 15 minutes late counts as an unexcused absence. Furthermore, your professor is entitled to deduct points for frequently joining the class late.
Exams, tests and quizzes, deadlines, and oral presentations that are missed due to illness always require a doctor's note as documentation. It is the student's responsibility to produce this doctor's note and submit it to site staff; until this doctor's note is produced the missed assessment is graded with an F and no make-up assessment is scheduled. In content classes, an F in one assignment may lead to failure of the entire class.

Regardless of whether an absence is excused or not, it is the student's responsibility to catch up with the work that was missed.

**Final exams**

Final exams must be taken at their designated times. Should there be a conflict between your final exams, please bring this to the attention of the Academics Team.

Students are not permitted to leave the site until their finals have been completed at the designated times. Upon receiving approval from the Academics Team, eligible graduating students may depart the site one day before their school, department or university graduation ceremony.

**Late Submission of Work**

1. Work submitted late receives a penalty of 2 points on the 100 point scale for each day it is late (including weekends and public holidays), unless an extension has been approved (with a doctor's note or by approval of NYU Berlin's administration), in which case the 2 points per day deductions start counting from the day the extended deadline has passed.

2. Without an approved extension, written work submitted more than 5 days (including weekends and public holidays) following the submission date receives an F.

3. Assignments due during finals week that are submitted more than 3 days late (including weekends and public holidays) without previously arranged extensions will not be accepted and will receive a zero. Any exceptions or extensions for work during finals week must be discussed with the Site Director, Dr. Gabriella Etmektsoglou.

4. Students who are late for a written exam have no automatic right to take extra time or to write the exam on another day.

5. Please remember that university computers do not keep your essays - you must save them elsewhere. Having lost parts of your essay on a university computer is no excuse for a late submission.

**Academic Honesty/Plagiarism**

As the University's policy on "[Academic Integrity for Students at NYU](https://www.nyu.edu/pennylvania/academic-integrity-center"") states: "At NYU, a commitment to excellence, fairness, honesty, and respect within and outside the classroom is essential to maintaining the integrity of our community. By accepting membership in this community, students take responsibility for demonstrating these values in their own conduct and for recognizing and supporting these values in others." Students at Global Academic Centers must follow the University and school policies.

NYU takes plagiarism very seriously; penalties follow and may exceed those set out by your home school. Your lecturer may ask you to sign a declaration of authorship form, and may
check your assignments by using TurnItIn or another software designed to detect offenses against academic integrity.

The presentation of another person’s words, ideas, judgment, images, or data as though they were your own, whether intentionally or unintentionally, constitutes an act of plagiarism. It is also an offense to submit work for assignments from two different courses that is substantially the same (be it oral presentations or written work). If there is an overlap of the subject of your assignment with one that you produced for another course (either in the current or any previous semester), you MUST inform your professor.

For guidelines on academic honesty, clarification of the definition of plagiarism, examples of procedures and sanctions, and resources to support proper citation, please see:

NYU Academic Integrity Policies and Guidelines
NYU Citations Style Guide

Inclusivity Policies and Priorities
NYU’s Office of Global Programs and NYU’s global sites are committed to equity, diversity, and inclusion. In order to nurture a more inclusive global university, NYU affirms the value of sharing differing perspectives and encourages open dialogue through a variety of pedagogical approaches. Our goal is to make all students feel included and welcome in all aspects of academic life, including our syllabi, classrooms, and educational activities/spaces.

Attendance Rules on Religious Holidays
Members of any religious group may, without penalty, excuse themselves from classes when required in compliance with their religious obligations. Students who anticipate being absent due to religious observance should notify their lecturer AND NYU Berlin’s Academics team in writing via e-mail one week in advance. If examinations or assignment deadlines are scheduled on the day the student will be absent, the Academics team will schedule a make-up examination or extend the deadline for assignments. Please note that an absence is only excused for the holiday but not for any days of travel that may come before and/or after the holiday. See also University Calendar Policy on Religious Holidays.

Pronouns and Name Pronunciation (Albert and Zoom)
Students, staff, and faculty have the opportunity to add their pronouns, as well as the pronunciation of their names, into Albert. Students can have this information displayed to faculty, advisors, and administrators in Albert, Brightspace, the NYU Home internal directory, as well as other NYU systems. Students can also opt out of having their pronouns viewed by their instructors, in case they feel more comfortable sharing their pronouns outside of the classroom. For more information on how to change this information for your Albert account, please see the Pronouns and Name Pronunciation website.

Students, staff, and faculty are also encouraged, though not required, to list their pronouns, and update their names in the name display for Zoom. For more information on how to make this change, please see the Personalizing Zoom Display Names website.
Moses Accommodations Statement
Academic accommodations are available for students with documented and registered disabilities. Please contact the Moses Center for Student Accessibility (+1 212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance. Accommodations for this course are managed through NYU Berlin.

Bias Response
The New York University Bias Response Line provides a mechanism through which members of our community can share or report experiences and concerns of bias, discrimination, or harassing behavior that may occur within our community.

Experienced administrators in the Office of Equal Opportunity (OEO) receive and assess reports, and then help facilitate responses, which may include referral to another University school or unit, or investigation if warranted according to the University's existing Non-Discrimination and Anti-Harassment Policy.

The Bias Response Line is designed to enable the University to provide an open forum that helps to ensure that our community is equitable and inclusive.

To report an incident, you may do so in one of three ways:

- Online using the Web Form
- Email: bias.response@nyu.edu
- US Phone Number: +1 212-998-2277
- Local Number in Berlin: +49 (0) 30 2902 91277

Please consider the environment before printing this syllabus. If printing is necessary, please select only the essential page range.