

Title

AI Education for Graduate Students at the University of Florida School of Architecture

Proposers

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Sponsoring Organization

College of Design Construction and Planning, School of Architecture

Purpose and Specific Objectives:

This proposal is to support a graduate certificate in Artificial Intelligence (AI) at the School of Architecture in the College of Design Construction and Planning. As technology continues to drive the advancement of the built environment, students in the field of architecture could significantly benefit from a strong foundation in AI and its applications. The School of Architecture is committed to providing its students with the skills and knowledge they need to excel in their academic life and future careers. We are seeking funding to support the creation of a comprehensive AI education platform within the framework of an AI graduate certificate. Our goal with the AI certificate is to provide graduate students with the opportunity to earn a certificate in “AI and Machine Learning” and to equip them with the tools they need to succeed in this rapidly evolving field.

To achieve our goal, we will create an AI education platform where all the lectures and code offered for the AI certificate will be housed. We have the support of the HiperGator specialist in facilitating such a space where code and data can be stored within the already existing infrastructure. In such a platform, graduate students can study subjects such as fundamentals for computation and coding, application of AI and Machine Learning, theoretical and philosophical stances in the field of AI and architecture, and finally, apply their knowledge in a design studio (Figure 02). In addition to the HiperGator coding platform, we will create a series of lectures to be streamed online and added to the canvas roster created for each course. To create such a learning experience, we need equipment for i) filming lectures, ii) server hardware, iii) software licenses, iv) student assistants, v) and professional installation services. This grant will support the first three items required for this effort.

Impact/Benefit:

The classes offered in the educational platform will be structured similarly to the successful CS50 series implemented at Harvard University (<https://www.youtube.com/@cs50>). The proposed certificate program offers a comprehensive and logical progression of courses aimed at equipping students with a strong foundation in coding and computation, as well as the theoretical and practical applications of AI and data-driven algorithms in design practices. All the proposed coding exercises will be run on the HiperGator coding platform. The lectures will be recorded/uploaded online and updated every semester to guarantee consistency and relevance in this evolving field. Figure 1 illustrates the courses and the allocation of credit hours. The program is designed to provide students with a holistic and in-depth understanding of the principles of coding and computation and the theoretical and practical applications of AI in design.

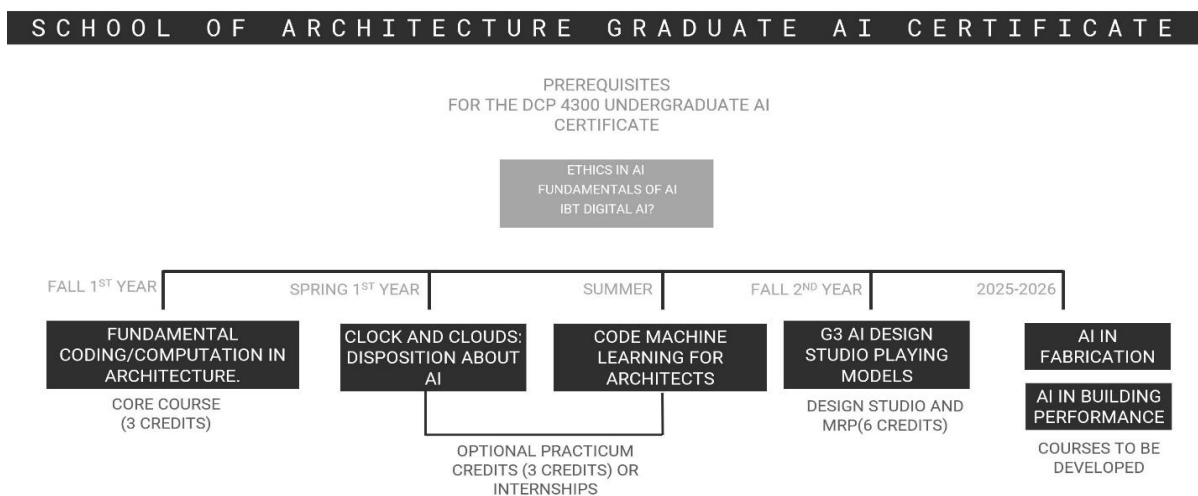


Figure 1. The curriculum of the AI Certificate

Sustainability

We recognize the need for a long-lasting and effective platform to provide valuable training for the next generation of architects, ensuring that our graduates are equipped with the knowledge and skills they need to succeed in their

careers. With a comprehensive AI education, our students will gain a competitive edge in the job market. According to Alekseeva et al.,¹ “there is an increase in the demand for AI skills over 2010–2019 in the U.S. economy, the highest is in IT occupations, followed by architecture and engineering, scientific, and management occupations”. Therefore, the AI certificate for graduate students is not just desirable but critically important. Our platform will provide accessible, high-quality AI education, making it possible to bridge the AI skills gap and equip students and professionals with the knowledge and skills they need to succeed in this rapidly evolving field. We are excited to make this project a reality with the support of funding from the 2023 UF Technology Fee, and we are confident that it will have a lasting impact on the AI initiative at UF.

We will implement several measures to ensure that our platform remains sustainable over time. The School of Architecture has committed to this initiative by assigning a GTA to aid in the course preparation, recording, and preprocessing. We also have the support of the College, which is instrumental in the creation of the certificate, learning platform, and online classes. To guarantee sustainability, we will focus on standardizing course content and developing the learning platform together with HiperGator specialists and an additional GTA. This will allow us to create a protocol for new and future classes, making the platform scalable and future-proof. With our commitment to making this certificate sustainable in time and the support from the School and College, we are confident that this platform will continue to provide valuable training for generations to come, helping advance the architecture field in a responsible and sustainable manner.

Timeline

Table 1 summarizes the timeline; it is a multi-year project involving careful planning and execution. By implementing the platform in the first year, piloting the classes in the second year, and deploying the classes in the third year, we can ensure that the platform is sustainable and effective in providing valuable training to the next generation of architects.

Table 1 Timeline of the project

	Spring 2024	Fall 2024	Spring 2025
<i>Setting up the infrastructure and developing the content.</i>	X		
<i>Hire GTA</i>	X		
<i>Develop a Platform with the HiperGator</i>	X		
<i>Test the platform in a real-world setting and make necessary modifications to improve the user experience.</i>		X	
<i>Filming the lecture</i>		X	
<i>Review the platform, including analyzing its performance and effectiveness based on SLOs.</i>			X
<i>Finalize the curriculum and make any necessary adjustments based on feedback from the pilot classes.</i>			X

Budget

Equipment for video and audio recording and processing		
Item	Price	Intended use
Sony FX3 Full Frame Cinema Camera	\$3625	Video recording
Sony a7 IV Mirrorless Camera	\$2210	Video recording and photo Capture
2x DJI RS 3 Pro Combo 3-Axis Gimbal Stabilizer	\$1440	Video footage stabilization
Sony 35mm f/1.8	\$691	Camera Lens (near)
Tamron 35-150mm f/2-2.8 Di III VXD Lens for Sony E	\$1899	Camera Lens (zoom)

¹ Alekseeva, Liudmila, et al. "The demand for AI skills in the labor market." *Labour economics* 71 (2021): 102002.

18" Teleprompter	\$240	Autocue
4x Sony NP-FZ100	\$238	Camera batteries
2x SanDisk 256GB Extreme PRO SDXC UHS-II Memory Card	\$500	Camera storage cards
Camera rigging, accessories and support (SmallRig)	\$400	Camera accessories
Lilliput A12 12.5" 4K video monitor	\$540	Video Monitor
Atomos Ninja V 5" 4K Recording Monitor with 1TB AtomX SSDmini & Mounting Kit	\$899	External video recording
2x Samsung 870 EVO 2TB 2.5 Inch SATA III	\$340	External recorder storage
2x Video Tripods and Fluid heads (Manfrotto)	\$848	Tripod
Sennheiser MKH 416 Shotgun Microphone	\$864	Audio Capture
2x Sennheiser ME 2 Omnidirectional Lavalier Microphone	\$224	Audio Capture
2x Tentacle Sync TRACK E	\$420	Pocket audio recorder
2x Tentacle Sync E mkII Timecode Generator	\$335	Timecode generation (audio sync)
Sound Devices MixPre-3	\$895	Audio Recording
2x Aputure LS C300d II Daylight LED Monolight	\$1682	Video Light
Impact 3x C-Stand with Turtle Base, Grip Head, 40" Extension Arm & Rolling Case Kit	\$656	3x C-stand for holding video lights
Portable room acoustic treatment kit	\$1400	Acoustic treatment
K-Tek KE-89CC	\$154	Boom pole (talent recording)
Aputure Light Dome II	\$172	Softbox / Light modifier
Aputure Lantern 90	\$115	Lantern / Light modifier (daylight)
Impact Pro Rapid 5 x 7' Portable Background	\$120	Chroma key green screen
SmallRig V Mount Battery VB99	\$232	Battery for powering video devices
Synology 60TB DiskStation DS1522+	\$1699	Footage storage, access and backup
Sub-Total	\$22838	

Computing infrastructure		
Item	Price	Intended use
Dell PowerEdge Server T550	\$20000	Hosting the tools/data used in the course
Synology 60TB DiskStation DS1522+	\$1600	Data storage
Sub-Total	\$21600	

Software		
Item	Price	Intended use
2x DaVinci Resolve Studio (Dongle)	\$600	Video Editing Software
2x Screenflow 10	\$338	Desktop Video Capture Software
2x Wolfram Mathematica Floating License	\$800	Computational framework
Sub-Total	\$1738	

<i>Personnel</i>			
Item	Price	Intended use	External funding
80h of student work	\$1600	Video recording assistance	SoA will cover salary
160h of student work	\$3200	Video editing assistance	SoA will cover salary
80h of professional computer service	\$5200	Implementation of the server	HiperGator
120h of professional computer service	\$7800	Library package installation/configuration	HiperGator
Sub-Total	\$17800		
TOTAL SUM			
	\$59176		

Budget Narrative

The University of Florida has a recording infrastructure that allows the basic recording of lectures. For example, FAB 103/105 is a lecture room commonly used by the School of Architecture that allows for HyFlex teaching. It also contains a document camera, an auto-tracking camera, a whiteboard, a DVD player, a camera, and other typical classroom equipment. Such equipment is practical and more than adequate for online teaching.

Our aspiration, however, is to develop a lecture series that rivals the professional level of audio and video production found in Harvard's acclaimed CS50 course for a fraction of the price. This undertaking will include the creation of high-quality content, which we intend to showcase on YouTube. Our online lecture series aims to promote UF as the premier destination in the United States for earning a certificate in computation in architecture. The caliber of production we aim to achieve will also enable us to expand our reach by offering a MOOC course in the future, thereby further enhancing our institution's reputation and influence in the field of architecture.

Achieving such high production goals only a decade ago required a much larger budget and hiring a team of professionals. Today, audio-video technology has advanced so much that with a relatively modest budget (as the one we are proposing), we could achieve similar results as if we hired professional production teams to do it for us. Consequently, the course we intend to offer would yield an exceptional cost-benefit ratio, given the relatively modest investment and the substantial returns in publicity it is projected to generate.

In addition to production values, we aspire to create strong virtual and physical identities for the AI teaching platform. This will be accomplished through strong and distinctive visual branding for the videos, which will require a largely permanent physical recording setup that all of the aforementioned classes can share and utilize with consistency. This will further enhance the brand identity of UF as a leader in AI, as we develop online course content that can be packaged and delivered to a broader audience such as Continuing Education Units (CEU) or partnerships with other institutions within the Florida State University System looking to expand their AI curriculum.

Besides serving to coordinate the virtual presence, this will also create a tangible physical presence, an "AI Space" that is strongly associated with the courses and becomes an informal gathering place to learn and exchange ideas about AI, even outside of scheduled class meetings. Finally, factoring this into the plans to create an AI Research Cluster within the upcoming DCP Collaboratory Building that is currently under detailed design development and projected for completion in late 2024, this "AI Space" will ultimately find its home within the exciting new cross-disciplinary DCP Collaboratory Building and serve as an identifiable virtual and physical anchor for teaching and research in AI.