

TO: The Engineering Faculty

FROM: The Faculty of the Lyles School of Civil Engineering

RE: New graduate course – CE 57401: Introduction to Applied Computer Vision in Civil Engineering

The Faculty of the Lyles School of Civil Engineering has approved the following new graduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM:

CE 59700 Image-based Sensing 3 credits

Fall 2023 (13), Fall 2019 (13), Fall 2016 (18)

No Prerequisites

TO:

CE 57401 Introduction to Applied Computer Vision in Civil Engineering

Fall

Three total credits

No Prerequisites

Course Description: This course is an introduction to fundamental topics within applied computer vision-based sensing for management and condition assessment of civil infrastructure systems. Some of the topics covered in this course include basic concepts in digital image processing, pattern recognition, and computer vision that are applicable for segmentation, clustering, 3D reconstruction of civil infrastructure elements, strain and displacement measurement, defect detection and structural health monitoring. Upon successful completion of this course the student shall be able to understand and utilize fundamental concepts in computer vision, image processing and machine learning to analyze images, stitch images, reconstruct the 3D scene, classify and recognize objects/damage, and quantify and track changes.

RATIONALE:

The rapid advancement of Artificial Intelligence (AI) has paved the way for groundbreaking interdisciplinary approaches in numerous fields, including civil engineering. This course is introduced to address the critical need for professionals who can harness the power of AI, specifically through image-based sensing and applied computer vision, to enhance the management and condition assessment of civil infrastructure systems. As infrastructure becomes increasingly complex, the integration of AI with traditional civil engineering practices is essential for the innovative analysis, monitoring, and maintenance of these critical systems. Students will learn to apply fundamental concepts in AI-driven image processing, machine learning, and computer vision to tackle real-world challenges such as 3D reconstruction of infrastructure elements, defect detection, and structural health monitoring. The interdisciplinary nature of this course bridges the gap between cutting-edge computational techniques and practical engineering applications, empowering students to lead the way in developing smart, AI-integrated solutions for the sustainable and resilient infrastructure of the future.

Head/Director of the Lyles School of Civil Engineering

Link to Curriculog entry: <https://purdue.curriculog.com/proposal:27498/form>