MATH 4770/MSSC 5770. Statistical Machine Vision. 3 cr. hrs.

Course Description: Object recognition and tracking for automatic machine vision systems. Topics include image representation, convolution, filter design, statistical deconvolution, discrete Fourier transform, automated object identification, text analysis, video object tracking and line tracing. Real-world applications such as object tracking within sequence of images, identification of item placement location in industrial settings, and autonomous lane departure identification. Additional topics may include object feature representations and statistical classification of objects. Computational implementation and examples utilize high-level programming language.

Dates and Times: Asynchronous Distance Learning.

Prerequisite: Computer programming such as COSC 1010; introductory calculus such as MATH 1450; and (bio)statistical methods such as MATH 4720 or MATH 4740.

Credit Hours: 3 credits

Frequency: Offered upon sufficient interest, generally in summers.

Audience: Math, statistics, data science, computer science, engineering students, and students from other majors who want to learn signal/image processing, object recognition and tracking.

Learning Outcomes: Students will

- Learn to use a high-level programming language
- Learn to apply convolution on images
- Learn to perform convolution via the DFT
- Learn to find and track objects in sequences of images using templates
- Learn to identify letters and words in scanned test
- Learn to find lines and edges of objects in images

Grading: Students will be graded based on weekly class assignments, exams and/or projects.

MATH 4770 SCALE:		93% - 100% (A)	90% - 93% (A-)
	87% - 90% (B+)	83% - 87% (B)	80% - 83% (B-)
	77% - 80% (C+)	73% - 77% (C)	70% - 73% (C-)
	65% - 70% (D+)	60% - 65% (D)	0% - 60% (F)

MSSC 5770: Students in MSSC 5770 will be expected to demonstrate mastery of additional statistical and numerical strategies on all homework assignments, exams, and/or projects.

MSSC 5770 SCALE:		93% - 100% (A)	90% - 93% (A-)
	87% - 90% (B+)	83% - 87% (B)	80% - 83% (B-)
	77% - 80% (C+)	73% - 77% (C)	0% - 70% (F)

Note: In all cases, lower end points are included not the upper end points.