ECE 767
Tracking and Sensor Information Fusion

COURSE OUTLINE
Please refer to course website for updated information.

CALENDAR DESCRIPTION

This is intended as a follow-up course for ECE771, which deals with single-sensor single-target tracking in a clean environment. This new course will introduce the advanced concepts and algorithms for multisensor-multitarget tracking under realistic conditions (with imperfect sensors and measurement uncertainties). In addition, this course will deal with multisource information fusion with applications to communications, signal processing and target tracking.

SCHEDULE AND MODE OF DELIVERY

Lecture: Fridays 2:00 a.m.- 5:00 p.m.

INSTRUCTOR

Dr. R. Tharmarasa
Email: thamas@mcmaster.ca
Office: ITB-A211
Phone: 905-525-9140 ext. 24171
Office Hours: By appointment

COURSE WEBSITE/S

http://avenue.mcmaster.ca

COURSE OBJECTIVES

By the end of this course, students should be able to:

• Implement a multitarget tracker to handle false alarms and miss detections.
• Select a suitable tracker/filter for a given tracking problem.
• Evaluate the performance of a tracker/fuser.
• Compare different tracking algorithms.
• Fuse tracks/measurements from multiple sources optimally.
• Develop an algorithm for a resource management problem.
ASSUMED KNOWLEDGE

Programming in MATLAB

COURSE MATERIALS

Textbooks:

Additional References:

COURSE OVERVIEW

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<td>Performance evaluation</td>
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<td>Tracking with multiple sensors</td>
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<td>Track initialization and track management</td>
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<td>Algorithms for tracking a single target in clutter</td>
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<td>Algorithms for tracking multiple targets in clutter</td>
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<td>Extended target tracking</td>
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<td>Performance prediction</td>
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<td>Resource management</td>
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<td>Nonlinear filters (PF, UKF,...)</td>
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<td>Sensor registration</td>
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<td>Practical issues</td>
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Note: all timings are approximate.

At certain points in the course, it may make good sense to modify the schedule. The instructor may modify elements of the course and will notify students accordingly (in class, on the course website).

ASSESSMENT

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As a McMaster graduate student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

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The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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**EXTREME CIRCUMSTANCES**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

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[www.eng.mcmaster.ca/ece](http://www.eng.mcmaster.ca/ece)