

ADVANCED COMPUTATIONAL IMAGING, GRADUATE CERTIFICATE

Modern medical imaging systems are complex, high-technology devices. Engineers designing and developing medical imaging systems must have knowledge and understanding around concepts not traditionally available in bachelor's degree programs in engineering or computing. Such concepts include:

- Mathematical foundations of tomography (images constructed from a series of "slices").
- Image artifacts that distort the images and how to correct them.
- Hardware and software for the embedded computing systems that are used to implement image construction and correction.

This program fills a need to prepare engineers with the knowledge, understanding, and abilities essential for a successful career in modern medical imaging systems.

Admission Requirements

Application Deadlines

Application deadlines vary by program, please review the application deadline chart (<http://uwm.edu/graduateschool/program-deadlines>) for specific programs. Other important dates and deadlines can be found by using the One Stop calendars (<https://uwm.edu/onestop/dates-and-deadlines>).

Admission

Students must have:

1. A baccalaureate degree.
2. A minimum 2.75 cumulative undergraduate grade point average.

Application

- Students wishing to obtain this certificate must declare their intention by applying to the program office or director.
- All graduate certificate applicants—even those already enrolled in a UWM graduate program—must apply to the Graduate School through the Panthera Admission Application (<https://graduateschool-apply.uwm.edu>).
- Graduate degree and previously admitted graduate non-degree students who decide to pursue a certificate program must submit the Panthera application before completing 6 credits in the certificate sequence.
- Applicants must possess a baccalaureate degree and have a minimum 2.75 cumulative undergraduate grade point average to be admitted in to a certificate program.

Credits and Courses

A minimum of 15 credits of which at least 12 credits must be taken at UWM.

Code	Title	Credits
	Medical Imaging Survey	
	Select one of the following:	3

ELECENG 437	Introduction to Biomedical Imaging ¹	
PHYSICS 782	Physics of Medical Imaging	
COMPSCI 657	Topics in Computer Science: (Edison A)	
ELECENG 490	Topics in Electrical Engineering: (Edison A)	
Tomography Foundations and Algorithms		
ELECENG 716	Tomography: Imaging and Image Reconstruction	3
ELECENG 717	Tomography: Image Quality and Artifact Correction	3
Computer Engineering Concepts		
ELECENG/COMPSCI 545	FPGA Embedded CPUs & Firmware Development ¹	3
COMPSCI 729	Real-Time Operating Systems	3
Total Credits		15

¹ Students who have taken ELECENG 437 or ELECENG 545/COMPSCI 545 or their equivalents as an undergraduate may substitute a relevant graduate course with the approval of the Certificate program. The program maintains a list of suggested substitute courses. The current list is:

- ELECENG 711/COMPSCI 711
- ELECENG 712/COMPSCI 712
- ELECENG 713/COMPSCI 713
- COMPSCI 718
- COMPSCI 758
- COMPSCI 762

Certificate Requirements

Transfer Credit

No more than 20% of the required credits may be taken at an institution other than UWM. These courses are subject to Graduate School transfer policy and must be approved by the director of the certificate program.

Grade Point Average Requirement

A minimum cumulative 3.00 grade point average in certificate courses taken at UWM is required.

Articulation with Degree Programs

1. Credits and courses required for a certificate may double count toward meeting UWM graduate degree requirements subject to the following restrictions:
 - Degree programs must approve the courses from certificates that can double count toward the degree.
 - All credits taken in completion of certificate requirements may count towards a UWM graduate degree as long as they do not contribute more than 90% of the total credits needed to obtain the degree. (Note: Students in PhD programs must still complete the minimum residency requirements)
 - Certificate courses used toward meeting degree requirements must be completed within the time limit for transfer credit.
2. Courses completed for a degree may be counted toward a subsequent certificate, subject to all certificate policy requirements.
3. A course may count toward no more than one certificate and one degree.
4. Students may not earn a certificate subsequent to a concentration in the same area.

Time Limit

Certificate program time limits shall be established as follows:

- 18 or fewer credits/Three years from initial enrollment in the certificate sequence.
- 19 or more credits/Four years from initial enrollment in the certificate sequence.

For certificates that are designed as add-ons to degree programs and are awarded concurrent with the degree, the time limit shall be the same as that of the degree program.