IMAGING

Requirements

Imaging concerns the collection, manipulation, analysis, generation, understanding and processing of images. It includes computer graphics, computer vision, optical imaging and filtering, signal processing and aspects of artificial intelligence and machine learning. Imaging is used across all areas of science and engineering, for example, in the vision systems in self-driving cars, in robotics, and in automating medical diagnostics, even to the point of detecting a person's pulse from a video of their face.

Rose-Hulman Institute of Technology offers a multidisciplinary minor in imaging. The minor requires 24 credits (6 courses): three required courses and three imaging electives from the list below. Since imaging is a multidisciplinary minor, at least 12 of the 24 credits must be courses that are not named required courses for the student's major.

Students choose a track to pursue. Each track allows the student to gain depth in a different area. Each has its own required courses and suggested electives (although any electives from the list below are acceptable).

Imaging Minor Requirements:

Track 1: Medical Imaging

Expected majors: BE, EE, CPE, PH, OE, NE

Code	Title	Hours
Required Courses		
ECE 584/BE 541/ OE 584	Medical Imaging Systems	4
ECE 480	Introduction to Image Processing	4
BE 321	Biosignal Processing	4
or ECE 380	Discrete-Time Signals and Systems	
Electives		
Select three electives from the Imaging Electives list below		12
Recommended Electives		
BE/OE 435	Biomedical Optics	4
MA 439	Mathematical Methods of Image Processing	4
CSSE 463	Image Recognition	4

Track 2: Image Recognition

Expected majors: CS, SE, PH/OE/NE, EE/CPE, MA, ME

Code	Title	Hours
Required Courses		
ECE 582/OE 537	Advanced Image Processing	4
CSSE 463	Image Recognition	4
CSSE/MA 416	Deep Learning	4
Electives		
Select three electives from the Imaging Electives list below		12
Recommended Electives		
CSSE/MA 415	Machine Learning	4
ECE 480/OE 437	Introduction to Image Processing	4
CSSE 461	Computer Vision	4

Track 3: Acquisition of Images

Expected majors: ECE, PHOE, BE

Code	Title	Hours
Required Courses		
ECE 480/OE 437	Introduction to Image Processing	4
PH 405	Semiconductor Materials & Applications	4
OE 295	Photonic Devices and Systems	4
Electives		
Select three electives from the Imaging Electives list below		12
Recommended Electives		
OE 480	Optical System Design	4
OE 392	Linear Optical Systems	4

Track 4: Creative Imaging

Expected majors: CS/SE, ECE, MA

Code	Title	Hours
Required Courses		
ARTS H244	Design and Color	4
CSSE 351	Computer Graphics	4
ECE 480	Introduction to Image Processing	4
Electives		
Select three electives from the Imaging Electives list below		12
Recommended Electives		
ARTS H142	Beginning Drawing	4
ARTS H242	Visual Arts in Civilization	4
MA 323	Geometric Modeling	4

Imaging Electives

(choose any 12 credits that are not required for your track, as long as at least 12 of the 24 credits for the minor are not named, required courses for your major)

Code	Title	Hours
ARTS H142	Beginning Drawing	4
ARTS H242	Visual Arts in Civilization	4
ARTS H244	Design and Color	4
BE 321	Biosignal Processing [1]	4
or ECE 380	Discrete-Time Signals and Systems	
BE/OE 435	Biomedical Optics	4
CSSE 313	Artificial Intelligence	4
CSSE 351	Computer Graphics	4
CSSE/MA 415	Machine Learning	4
CSSE/MA 416	Deep Learning	4
CSSE 451	Advanced Computer Graphics	4

CSSE 461	Computer Vision	4
CSSE 463	Image Recognition	4
ECE 480/OE 437	Introduction to Image Processing	4
ECE 580	Digital Signal Processing	4
ECE 582/OE 537	Advanced Image Processing	4
ECE 584/BE 541/ OE 584	Medical Imaging Systems	4
MA 323	Geometric Modeling	4
MA 371	Linear Algebra I	4
or MA 373	Applied Linear Algebra for Engineers	
MA 439	Mathematical Methods of Image Processing	4
NE 406/506	Semiconductor Devices & Fabrication	4
OE 295	Photonic Devices and Systems	4
OE 392	Linear Optical Systems	4
OE 480/580	Optical System Design	4
OE 592	Fourier Optics & Applications	4
PH 431	Advanced Observational Astronomy	2
Any special topics course or independent study in any major that involves imaging (must be approved by the Imaging Program Director).		4

[1] only one can be taken as a minor elective