

Cardiothoracic Surgery

Chair

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Program Director

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Undergraduate certificate: perfusion technology

Website: <https://perfusion.medicine.uiowa.edu/>

The University of Iowa cardiothoracic surgery program is the third oldest program of its kind in the United States. Since its establishment in 1948 as a division within the Department of Surgery, it is now its own department providing operative interventions for patients with diseases of the chest and performing a broad range of the most current and innovative surgical procedures.

Cardiothoracic surgery's facilities are located at University of Iowa Health Care. Each year cardiothoracic surgeons at the hospitals perform more than 500 adult and pediatric heart surgeries, including coronary bypasses, transplants, and placement of mechanical cardiac assist devices; minimally invasive procedures such as mitral valve replacement and epicardial lead placement; coronary artery bypass grafting using robotics; and more than 600 general thoracic surgeries with emphasis on esophageal and lung diseases.

The Perfusion Technology Program is a 20-month program of study. For more information about the Perfusion Technology Program, visit the Perfusion Technology Program website.

Programs

Undergraduate Program of Study Certificate

- Certificate in Perfusion Technology

Residency

Iowa's cardiothoracic surgery residency program was established in 1948 and is fully accredited by the Accreditation Council for Graduate Medical Education (ACGME). It is the only cardiothoracic surgery training program in Iowa. One resident is accepted into the two-year fellowship program each year. Cardiothoracic surgery was approved by the ACGME to start a six-year integrated thoracic residency. Medical students begin the program after they graduate from medical school. A new resident enters the program each year.

Facilities

Cardiothoracic surgery has specialty laboratories in gastric motility, analytical chemistry, transplantation, tissue culture, surgical bacteriology, shock, and cardiac bypass. These facilities permit the study of experimental procedures such as heart valve replacement in large animals and heterotopic heart transplantation in ferrets.

Courses

- Cardiothoracic Surgery Courses
- Perfusion Technology Courses

Cardiothoracic Surgery Courses

CTS:8401 Advanced Inpatient Subinternship in Cardiothoracic Surgery **arr.**

Participation in diagnosis, preoperative, operative, and postoperative care of thoracic and cardiac patients; attendance at division conferences; students assume responsibility and act as an intern; may concentrate interest in cardiac surgery or thoracic surgery; diagnosis and management of patients on an inpatient service under close supervision by an upper-level resident/fellow and faculty member.

CTS:8497 Research in Cardiothoracic Surgery **arr.**

Work on a short- or long-term research project arranged with instructor; may involve clinical material or laboratory; students organize and complete a project, finishing with a publishable manuscript.

CTS:8498 Cardiothoracic Surgery On Campus **arr.**

Clinical clerkship individually arranged by student with department approval.

CTS:8499 Cardiothoracic Surgery Off Campus **4 s.h.**

Individually arranged by student with approval of department to rotate outside of University of Iowa Health Care. Requirements: MD enrollment.

Perfusion Technology Courses

PERF:4162 Pathophysiology of Perfusion Technology **5 s.h.**

Hemostasis, acid base physiology, gas transfer, heart anatomy, heart embryology, congenital cardiac defects. Requirements: Perfusion Technology Program enrollment.

PERF:4180 Cardiovascular Anatomy for Perfusion **2 s.h.**

Study of cardiovascular anatomy essential to clinical perfusion. Topics include the heart, great vessels, and thoracic structures relevant to extracorporeal circulation. Emphasizes anatomical relationships critical to cannulation, bypass procedures, and perfusion management. Requirements: Perfusion Education Program enrollment.

PERF:4181 Advanced Perfusion Practice Experience I **6 s.h.**

Clinical experience in cardiovascular operating rooms and related settings, allowing students to apply perfusion concepts in real-world procedures. Emphasizes the operation of heart-lung machines, patient monitoring, cannulation techniques, and interdisciplinary teamwork. Students continue developing the technical skills and clinical judgment essential for safe and effective perfusion practice. Requirements: Perfusion Education Program enrollment.

PERF:4182 Advanced Perfusion Practice Experience II **6 s.h.**

Builds on prior clinical training, providing increased responsibility in operating perfusion equipment during cardiac procedures. Students continue to refine technical skills, apply clinical judgment, and manage patient-specific perfusion strategies under supervision. Requirements: Perfusion Education Program enrollment.

- PERF:4183 Advanced Perfusion Practice Experience III** 6 s.h.
Continuation of PERF:4182; management of cardiopulmonary bypass system. Requirements: Perfusion Education Program enrollment.
- PERF:4184 Advanced Perfusion Practice Experience IV** 6 s.h.
Continuation of PERF:4183; emphasis on supply maintenance, perfusion department management. Requirements: Perfusion Education Program enrollment.
- PERF:4185 Advanced Perfusion Practice Experience V** 6 s.h.
Continuation of PERF:4184. Requirements: Perfusion Education Program enrollment.
- PERF:4186 Advanced Perfusion Practice Experience VI** 6 s.h.
Students function at the level of entry-level professionals, managing complex and specialty perfusion cases with supervision. Emphasizes practice, certification readiness, and transition to professional roles. Requirements: Perfusion Education Program enrollment.
- PERF:4187 Devices in Perfusion** 2 s.h.
Components of extracorporeal circuit; in vitro laboratory evaluation of components. Requirements: Perfusion Education Program enrollment.
- PERF:4188 Instrumentation in Perfusion** 4 s.h.
Electrical circuitry, filters, pressure transducers, thermistors, cardiac output computers, fluid dynamics, intra-aortic balloon pumps, blood gas analyzers. Requirements: Perfusion Education Program enrollment.
- PERF:4189 Introductory Perfusion Practice Experience I** 2 s.h.
Perfusion in operating room: patient workup, observation, and reporting on extracorporeal setup, surgical procedure. Requirements: Perfusion Education Program enrollment.
- PERF:4190 Introductory Perfusion Practice Experience II** 2 s.h.
Continuation of PERF:4189; setup of extracorporeal circuit; ancillary duties of perfusionist. Requirements: Perfusion Education Program enrollment.
- PERF:4191 Pathophysiology for Perfusion I** 2 s.h.
Hemostasis, acid base physiology, gas transfer, heart anatomy, heart embryology, and congenital cardiac defects. Requirements: Perfusion Education Program enrollment.
- PERF:4192 Pathophysiology for Perfusion II** 2 s.h.
Continuation of PERF:4191. Study of hemostasis, acid base physiology, gas transfer, heart anatomy, heart embryology, and congenital cardiac defects. Requirements: Perfusion Education Program enrollment.
- PERF:4193 Perfusion Seminar I** 1 s.h.
Ethics in perfusion. Requirements: Perfusion Education Program enrollment.
- PERF:4194 Perfusion Seminar II** 1 s.h.
Continuation of PERF:4193. Ethical aspects of perfusion; professional development. Requirements: Perfusion Education Program enrollment.
- PERF:4195 Perfusion Seminar III** 1 s.h.
Continuation of PERF:4194. Ethical aspects of perfusion; professional development. Requirements: Perfusion Education Program enrollment.
- PERF:4196 Perfusion Seminar IV** 1 s.h.
Continuation of PERF:4195. Ethical aspects of perfusion; professional development. Requirements: Perfusion Education Program enrollment.
- PERF:4197 Perfusion Seminar V** 1 s.h.
Ethical aspects of perfusion; professional development. Requirements: Perfusion Education Program enrollment.
- PERF:4198 Pharmacology for Perfusion I** 2 s.h.
Basic principles of pharmacotherapeutics and pharmacologic interventions; focus on mechanism of drug actions in patient treatment. Requirements: Perfusion Education Program enrollment.
- PERF:4199 Pharmacology for Perfusion II** 2 s.h.
Principles of pharmacotherapeutics and pharmacologic interventions; focus on mechanism of drug actions in patient treatment. Requirements: Perfusion Education Program enrollment.
- PERF:4200 Principles and Practice of Perfusion** 4 s.h.
Hypothermia, hemodilution, left heart bypass, dialysis, ultrafiltration, membrane and bubbler oxygenation. Requirements: Perfusion Education Program enrollment.
- PERF:4201 Research in Perfusion I** 1 s.h.
From topic selection to manuscript. Requirements: Perfusion Education Program enrollment.
- PERF:4202 Research in Perfusion II** 1 s.h.
Focus on protocol development, methodology selection, and institutional review board (IRB) preparation. Requirements: Perfusion Education Program enrollment.
- PERF:4203 Research in Perfusion III** 1 s.h.
Data collection and analysis. Emphasizes maintaining research integrity, managing clinical data, and adapting to practical challenges during implementation. Requirements: Perfusion Education Program enrollment.
- PERF:4204 Research in Perfusion IV** 1 s.h.
Data analysis and drafting research findings. Focus includes scientific writing, interpreting results, and integrating evidence into clinical context. Requirements: Perfusion Education Program enrollment.
- PERF:4205 Research in Perfusion V** 1 s.h.
Manuscript finalization, editing, formatting for publication or presentation, and defending findings in academic or professional settings. Requirements: Perfusion Education Program enrollment.