Master of Translational Orthopedic Device Engineering (MTODE) Handbook 2025-26

Program Information

The Master of Translational Orthopedic Device Engineering (MTODE) is a 30-credit graduate program offered by the Rowan-Virtua School of Translational Biomedical Sciences and Engineering at Rowan University. It is primarily delivered online, with two required one-day visits in clinical immersions and virtual reality surgical simulations. The curriculum spans two consecutive semesters, starting every fall, and is designed to be completed within one academic year.

Program Coordinator Contact Information

- **Program Inquiries & Applications:** tode@rowan.edu
- **Program Coordinator:**
  Hamid Hosseinzadeh
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Contacts for Questions & Concerns

- **Academic & Curriculum Issues:** Program Coordinator (tode@rowan.edu)
- **Academic Records & Registration:** OASIS (Office of Academic Student Information Services)
  Email: globalstudent@rowan.edu
  Phone: +1-856-256-5435
- **Transfer Credit Evaluation:** OASIS Academic Advisor – Graduate Studies (globalstudent@rowan.edu)

OASIS Academic Advisor (Graduate Studies)

Office of Academic Student Information Services (OASIS) Academic Advisor for graduate programs
Email: globalstudent@rowan.edu
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Course Sequence

Semester	Course	Credits
First Semester	Orthopedic Device Engineering (TODE 10501)	4
	Orthopedic Engineering Elective	3
	Applied Orthopedic Engineering (TODE 10507)	4
	Orthopedic Clinical Immersion (TODE 10505)	3
	Orthopedic Device Engineering Seminars I (TODE 10509)	1
Second Semester	Clinical Applications of Orthopedic Devices (TODE 10502)	2
	Orthopedic Device Technology Transfer (TODE 10504)	2
	Orthopedic Engineering Elective	3
	Applied Orthopedic Engineering (TODE 10508)	4
	Orthopedic Clinical Immersion II (TODE 10506)	3
	Orthopedic Device Engineering Seminars II (TODE 10510)	1

Orthopedic Device Engineering (TODE 10501)

This foundational course introduces the principles and practices of orthopedic device engineering, emphasizing the design, development, and evaluation of implants and related medical devices for musculoskeletal applications. Topics include skeletal anatomy and biomechanics, biomaterials and biocompatibility, device design and fabrication methods, as well as mechanical and biological testing. Students will explore orthopedic implants, prostheses, braces, splints, and advanced technologies, including additive manufacturing, smart materials, and tissue engineering. The course builds the analytical and technical framework for future orthopedic device development and clinical translation.

Clinical Applications of Orthopedic Devices (TODE 10502)

This course explores the clinical and engineering integration of orthopedic devices and their applications in surgical practice. It covers the rationale, design, and functional analysis of implants, prostheses, and braces, as well as the surgical instruments and techniques associated with them. Students learn to evaluate device performance,

surgical outcomes, and complications across procedures, including fracture fixation, arthroplasty, arthroscopy, and soft-tissue repair. Emphasis is placed on translating engineering principles into clinically relevant solutions that improve patient outcomes.

Orthopedic Device Technology Transfer (TODE 10504)

This course provides a comprehensive understanding of the regulatory and commercialization processes for orthopedic medical devices across major international frameworks. Students examine the FDA, EU MDR, and UKCA pathways, as well as premarket submission types (PMA, 510(k)), clinical trials, and post-market surveillance requirements. The course also introduces intellectual property management, patent law, ethics in device development, and principles of technology transfer and entrepreneurship. Through applied case studies, students learn how orthopedic innovations progress from concept to market-ready products.

Orthopedic Clinical Immersion I & II (TODE 10505 & 6)

These two consecutive courses provide immersive exposure to orthopedic surgical environments, materials, and technologies through direct observation and virtual reality simulation. Each student participates in two-day, hands-on clinical sessions at partner hospitals (Virtua Health) and weekly virtual sessions using Oculus VR headsets and PrecisionOS technology.

Part I (TODE 10.505) introduces orthopedic surgical techniques, including fixation, nailing, and arthroscopy, while Part II (TODE 10.506) extends to complex procedures such as arthroplasty, spine surgery, and robotic-assisted operations. Students gain practical insights into surgical workflows, device performance, and interdisciplinary collaboration between engineers and surgeons.

Applied Orthopedic Engineering I & II (TODE 10507 & 8)

These sequential research courses train students in applied and translational research within the field of orthopedic engineering.

Part I (TODE 10.507) focuses on defining a clinically relevant research problem in collaboration with surgeons and faculty mentors, performing literature reviews, needs assessments, and computational modeling.

Part II (TODE 10.508) continues the project through data collection, computational or experimental analysis, and dissemination of results. Students are encouraged to produce a conference paper, journal article, or patent submission as a final deliverable. The courses develop advanced analytical, computational, and communication skills essential for clinical and industrial research in the field of orthopedic device innovation.

Orthopedic Device Engineering Seminars I & II (TODE 10509 & 10)

These seminar courses feature weekly expert-led discussions by surgeons, biomedical engineers, and industry professionals.

Seminars I (TODE 10.509) address emerging topics, including biomaterials, implant design, sterility, surface engineering, and additive manufacturing.

Seminars II (TODE 10.510) continues with advanced subjects including robotic surgery, biosensors, tendon and ligament reconstruction, and personalized orthopedic devices. Students critically engage with contemporary challenges and innovations, connecting theoretical learning with ongoing translational research and industrial trends to foster a deeper understanding.

Orthopedic Engineering Elective

The following elective courses are currently approved for the Master of Science in Biomedical Engineering program; this coursework is to be determined in consultation with the student's advisor and the Graduate Program Coordinator:

(BME 11550) Advanced Biocompatibility and Immunoengineering (3 CR)
(BME 11590) Robotics and Image Guided Surgery (3 CR)
(BME 11551) Advanced Mechanobiology (3 CR)
(BME 11554) Advanced Stem Cell Engineering (3 CR)
(BME 11574) Advanced Topics in Controlled Release (3 CR)
(BME 11556) Advanced Nanoparticle Design and Engineering (3 CR)
(BME 10590) Principles in Biomechanics (3 CR)

(BME 11573) Biomaterials Engineering (3 CR)

Academic Records and FERPA Information

All student educational records are protected under the Family Educational Rights and Privacy Act (FERPA). Students have the right to inspect, review, and request amendments to their education records; disclosures without consent are strictly limited by federal law.

Thesis/Dissertation Requirements

This professional master's program does not require a formal thesis or dissertation. Instead, students undertake a research project within "Applied Orthopedic Engineering I & II."

Licensure/Certification Requirements

No state or federal licensure is required to complete this degree.

Program Residency Requirement

There is no residency requirement. The program is delivered online, with mandatory but brief on-site clinical immersions.

Supervised Practice Requirements and Expectations

Students engage in hands-on surgical procedures on models and observe live surgeries in Virtua Health System operating rooms during two one-day immersions (TODE 10.505 & 10.506). VR simulation sessions are conducted weekly via Oculus Quest 3.

Length of Time for Degree Completion

Students are expected to complete all requirements within two consecutive semesters (one academic year). Under Rowan Global policy, graduate programs must conclude within 18 consecutive terms (six years) from the date of matriculation.

Leave of Absence Policy

Matriculated graduate students may request a Leave of Absence (LoA) for up to 12 months by consulting their Program Coordinator and submitting the official Leave of Absence Request form. Approved leaves do not count against time-to-degree limits.

Master's Degree Ramp-Off Options

Not applicable; there is no Ph.D. pathway diversity.

Graduate Transfer Credit Evaluation

Up to 9 graduate credits from accredited institutions may be transferred with the approval of the Program Coordinator and OASIS; however, transfer credits must be evaluated before the add/drop deadline.

Academic Standing (Probation/Suspension)

Graduate students are required to maintain a cumulative GPA of 3.0 or higher. Falling below 3.0 triggers academic probation; continued deficiencies may result in suspension or university dismissal.

All 30 credits of the Master of Translational Orthopedic Device Engineering must be completed with equivalent grades of B- or higher. A graduate course may be retaken one time without prior approval; however, a second retake requires approval from both the student's advisor and the Rowan-Virtua School of Translational Biomedical Engineering & Sciences Graduate Program Coordinator.

Additional requirements:

A. Successful completion of Ethical and Responsible Conduct of Research Training and Safety Training (1st term of enrollment and ongoing, as necessary)
B. Successful completion of required technical coursework

C. Generation of new knowledge and/or technology in the orthopedic device engineering field via a student project. Minimum requirements will be established by the student's mentor and advisors.

Timeline note: Students enter the program in the Fall semester and finish the program in the following Spring semester. The students can take the program as a part-time one, completing 30 credit hours during 4 semesters, starting in the Fall and ending in the Spring.

Academic Integrity Policies

University-Wide Coursework

Policy No. AA:2015:02 defines academic misconduct (cheating, plagiarism, fabrication) and sanctions classified in four levels. (confluence.rowan.edu)

Graduate Examination Components

Graduate examinations, candidacy assessments, and scholarly outputs require heightened integrity, ethical research conduct, and respect for intellectual property. Violations incur disciplinary action.

Accommodations Policy

Since the MTODE is an online program, Rowan University has no obligation to provide accommodation. Students seeking accommodations must register with the Academic Success Center – Accessibility Services at successcenter@rowan.edu or 856-256-4234, submitting required documentation.

Attendance Requirements

Courses combine online synchronous/asynchronous sessions with mandatory two one-day in-person immersions per year.

Travel and Financial Support

The program does not cover student travel expenses; participants are responsible for all costs related to on-site immersions. Student travel reimbursement follows Rowan's Accounts Payable policies.

Program Dismissal Guidelines

Program dismissal may be enacted if a student fails program-specific benchmarks (e.g., capstone, clinical placements). Dismissal takes immediate effect, ends matriculation, and is documented as a hold (not transcript notation). Students may appeal first within the program, then to the School of Graduate Studies.

Remediation/Performance Improvement Plans

Students on probation or who fail a requirement will meet with the Program Coordinator to develop a Performance Improvement Plan outlining deficiencies, actions (e.g., retaking courses, supplemental assignments), and a one-semester remediation timeline. (sites.rowan.edu)

Appeal Process

Students may appeal program-level decisions in accordance with the program handbook. In the absence of a resolution, they may file an appeal with the School of Graduate Studies within ten business days of receiving notification. (sites.rowan.edu)

Conflict Resolution Procedures

Student-Faculty Grievances

1. **Departmental Level:** Meet with the faculty member; if unresolved, meet with the department chair within 20 calendar days of awareness.
2. **College/Unit Level:** If unresolved, within 15 working days, meet with the dean/director, who will render a decision within 15 working days. Further appeals may be referred to the Senate Ethics Committee. (confluence.rowan.edu)

Graduation and Commencement Procedures

Graduation

Students must submit an Application for Graduation by the published deadline and complete all degree requirements. Degree conferral is processed after final grades are posted and (if applicable) formatting approvals are secured. (sites.rowan.edu)

Commencement

Master's students within six credits of completion may register via Marching Order (registration opens February 1; tickets required). Participation does not guarantee degree conferral. (sites.rowan.edu)

International Student Information

For students in the **Master of Translational Orthopedic Device Engineering (MTODE)** program who are studying abroad, the following details apply specifically to internationalizing your enrollment and maintaining compliance with U.S. federal regulations and university policy.

Admission Documentation

- Proof of English-language proficiency (e.g., TOEFL, IELTS, or Duolingo) is required unless an exemption applies (e.g., prior degree taught in English). https://sites.rowan.edu/international/englishlanguagepolicy.html
- International admission is offered for the Fall and Spring terms only (not Summer for visa-status students).
- Students studying from abroad (not physically present in the U.S.) will need to confirm that their mode of enrolment is permitted by University policy and U.S. immigration regulations. (Students should consult the International Center.)

Health Insurance & Medical Requirements

- Students studying primarily online but with required U.S. presence (for immersions) must still ensure they have adequate U.S. coverage while physically present on campus or in the U.S.

Practical Training

- Online programs do not necessarily provide CPT/OPT eligibility unless structured to meet U.S. immigration requirements. International students should consult the International Center as soon as possible.
- Participation in the in-person clinical immersion counts toward the program but must be authorized by ISSS as practical training if required.

Technology & Connectivity Requirements

- International students must secure reliable high-speed internet, computing hardware, and any required VR headset (e.g., Oculus Quest-3) for the online and immersive elements of the MTODE program.
- Time-zone differences and synchronous meeting times must be considered; students located outside the U.S. should plan accordingly.

Deferral, Leave, and Change of Status

- International students may defer admission once (graduate level students may defer up to one year) if the request is submitted by the deadline. Failure to enroll may void the admission and I-20. (Rowan University)