Cell and Gene Therapies, MS (Online)

Northeastern University's Master of Science in Cell and Gene Therapies (Online) is a professional master's program and an innovative, non-thesis graduate degree offering flexible learning options. While courses are delivered online, the program also provides on-ground options and/or substitutes for the required courses. The curriculum combines advanced interdisciplinary training in emerging therapies, such as cell and gene therapies, with the development of high-value business skills critical to success in today's dynamic workplace. Designed to prepare graduates to innovate, collaborate, and lead, the program equips students for research, managerial, or technical roles across a wide range of cell and gene therapy fields.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Code	Title	Hours
Required Core		
BIOL 5543	Stem Cells and Regeneration	4
BIOL 5583	Immunology	4
BIOL 5821	Cell and Gene Therapies	4
BIOL 6216	Applied Bioinformatics	4
BIOL 6381	Ethics in Biological Research	2
BIOT 5830	Regulatory Landscape of Cell and Gene Therapies	2
PMST 6254	Advanced Drug Delivery Systems	3
or NNMD 5580	Nanodrug Delivery Systems: Design, Visualization, and Modeling	
Complete 3 semester hours from the following two options:		3
BIOT 5630 and BIOT 7244	Cell Culture Applications for Biopharmaceuticals and Biotechnology Applications Practicum	
BIOT 5840	Cell and Gene Therapy Lab	
Experiential Learning		
EESC 6500	Pathways to Professional Success	1
Complete at least one of the following; any credit-bearing course used to fulfill this requirement will also count toward the elective requirement:		
EESC 6964	Co-op Work Experience	
or EESC 6954	Co-op Work Experience - Half-Time	
or EESC 6965	Co-op Work Experience Abroad	
BIOL 6966	Practicum	
BIOL 6976	Directed Study	
NNMD 6390	Experiential AI Capstone	
Elective		
Complete a minimum of 5 semester hours from the following to meet the 32 total hours for the program:		5
BIOE 6000	Principles of Bioengineering	
BIOL 5100	Biology Colloquium	
BIOL 5549	Inventions in Microbial Biotechnology	
BIOL 5573	Medical Microbiology	
BIOL 5591	Advanced Genomics	
BIOL 5595	Cell and Molecular Neuroscience	
BIOL 5597	Immunotherapies of Cancer and Infectious Disease	
BIOL 6131	CRISPR: Gene Editing Fundamentals	
BIOL 6301	Molecular Cell Biology	
BIOL 6966	Practicum	
BIOL 6976	Directed Study	
BIOT 5145	Biotechnology Lab Skills	
BIOT 5219	The Biotechnology Enterprise	
BIOT 5220	The Role of Patents in the Biotechnology Industry, Past and Future	
BIOT 5330	Drug Safety and Immunogenicity	
BIOT 5340	Introduction to Biotherapeutic Approvals	
BIOT 5401	Scientific Communication and Problem Solving in Biotechnology	

BIOT 5560	Bioprocess Fundamentals
BIOT 5630	Cell Culture Applications for Biopharmaceuticals
BIOT 5635	Downstream Processes for Biopharmaceutical Production
BIOT 5850	Higher-Order Structure Analytics
BIOT 5900	Emerging Innovations in Biotechnology and Pharma
BIOT 6300	Pharmaceutical Microbiology
BIOT 6320	Design and Development of Biopharmaceuticals
BIOT 6340	Sterile Manufacturing Operations
BIOT 6900	AI-Powered Biotech Workflows: From Discovery to Clinic
CHME 5101	Fundamentals of Chemical Engineering: Fluid, Heat, and Mass Transfer
CHME 5160	Drug Delivery: Engineering Analysis
CHME 5631	Biomaterials Principles and Applications
CHME 5632	Advanced Topics in Biomaterials
NNMD 5270	Foundations in Nanomedicine: Therapeutics
NNMD 5271	Foundations in Nanomedicine: Diagnostics
NNMD 5272	Nanomedicine Seminar
NNMD 5310	Bioethics in the Age of Artificial Intelligence
NNMD 6390	Experiential AI Capstone
PHTH 5310	Budget Principles in Public Health
PHTH 5300	Project Management in Public Health
PHSC 5500	Repurposing Drugs for Cancer Immunotherapies

Program Credit/GPA Requirements

32 semester hours required
Minimum 3.000 GPA required