Advanced Manufacturing

DEGREES OFFERED

• Certificate in Advanced Manufacturing
• Master of Science in Advanced Manufacturing (Non-Thesis)

PROGRAM DESCRIPTION

The interdisciplinary Advanced Manufacturing graduate program will prepare graduates to meet the challenges of careers in advanced manufacturing.

Program Requirements

Professional Graduate Certificate (12 credit hours)

AMGN401/501 Introduction to Additive Manufacturing (pre-or-co-requisite for the other three core courses) 3.0
AMGN598 Structural Materials for Additive Manufacturing 3.0
AMGN598 Data-Driven Materials Manufacturing 3.0
AMGN498/598 Design for Additive Manufacturing 3.0

Total Semester Hrs 12.0

Master of Science, Non-Thesis (30 credit hours)

AMGN401/501 Introduction to Additive Manufacturing (pre-or-co-requisite for the other three core courses) 3.0
AMGN598 Structural Materials for Additive Manufacturing 3.0
AMGN598 Data-Driven Materials Manufacturing 3.0
AMGN498/598 Design for Additive Manufacturing 3.0
AMGNXXX Advanced Manufacturing Electives Up to 6 hours may be replaced with project-based independent study 18.0

Total Semester Hrs 30.0

The Advanced Manufacturing program will be anchored by four signature core courses (three of which will be new to the catalog) and will offer a diverse array of electives drawn from an approved list of existing courses within the ME, MME, EE, CS, Physics and Math departments. Students who choose the MS-NT degree option will choose their electives with the intent of specializing in one of two key areas (or they can choose to diversify across both areas):

• Additive Manufacturing of Structural Materials
• Data-Driven Materials Manufacturing

Advanced Manufacturing Electives:

Additive Manufacturing of Structural Materials

MEGN511 FATIGUE AND FRACTURE 3.0
MEGN515 COMPUTATIONAL MECHANICS 3.0
MLGN505 MECHANICAL PROPERTIES OF MATERIALS 3.0
MTGN514 DEFECT CHEMISTRY AND TRANSPORT PROCESSES IN CERAMIC SYSTEMS 3.0
MTGN557 SOLIDIFICATION 3.0

Data-Driven Materials Manufacturing

CSCI507 INTRODUCTION TO COMPUTER VISION 3.0
CSCI508 ADVANCED TOPICS IN PERCEPTION AND COMPUTER VISION 3.0
CSCI575 MACHINE LEARNING 3.0
EENG509 SPARSE SIGNAL PROCESSING 3.0
EENG511 CONVEX OPTIMIZATION AND ITS ENGINEERING APPLICATIONS 3.0
EENG515 MATHEMATICAL METHODS FOR SIGNALS AND SYSTEMS 3.0
EENG517 THEORY AND DESIGN OF ADVANCED CONTROL SYSTEMS 3.0
MATH530 STATISTICAL METHODS I 3.0
MATH551 COMPUTATIONAL LINEAR ALGEBRA 3.0
MEGN544 ROBOT MECHANICS: KINEMATICS, DYNAMICS, AND CONTROL 3.0
MEGN545 ADVANCED ROBOT CONTROL 3.0
MEGN587 NONLINEAR OPTIMIZATION 3.0
MEGN588 INTEGER OPTIMIZATION 3.0
MEGN688 ADVANCED INTEGER OPTIMIZATION 3.0
MTGN560 ANALYSIS OF METALLURGICAL FAILURES 3.0
MTGN564 ADVANCED FORGING AND FORMING 3.0
MTGN565 MECHANICAL PROPERTIES OF CERAMICS AND COMPOSITES 3.0
MTGN580 ADVANCED WELDING METALLURGY 3.0
PHGN585 NONLINEAR OPTICS 3.0