Mechanical and Smart Manufacturing Engineering - Master of Engineering

The Master of Engineering in Mechanical and Smart Manufacturing Engineering (MSME) prepares students for future engineering practice that requires a higher level of mastery in mechanical and manufacturing engineering. It is best suited for individuals with backgrounds in mechanical engineering or related areas such as materials science, manufacturing, biomedical engineering or physics. The degree includes core courses in mathematical modeling, dynamical systems and control, thermal-fluid systems, mechanics and mechanical behavior of materials, and advanced manufacturing as well as diverse options for courses in science, engineering, and mathematics.

All students are required to complete graduate coursework as defined below:

- Students must earn **a minimum of 30 credit hours** (with a **minimum of 18 credit hours of concentration courses**), with an option for 3-6 credit hours of non-thesis project or internship.

Program Requirements

The program requires completion of a minimum of 30 credit hours, with a minimum of 18 credit hours of concentration courses (including the culminating experience credit hours). The distribution of hours is summarized as follows:

Culminating Experience

3-6 credit hours of MME 640 (Internship)/MME 704 (Non-thesis project), or equivalently 3-6 credit hours of graduate level Elective courses

Code	Title	Credit Hours
MME 640	Internship	3-6
MME 704	Non-Thesis Project	3-6

Concentration Courses

Code	Title	Credit Hours
MME 503	Heat Transfer [1]	3
MME 512	Advanced Mechanics of Materials [1]	3
MME 513	Introduction to Compressible Flow [1]	3
MME 532	Digital Manufacturing	3
MME 533	Smart Factory	3
MME 535	Process Engineering	3
MME 536	Control of Dynamic Systems [1]	3
MME 538	Mechanics, Analysis, and Control of Robots	3
MME 570	Special Topics in Mechanical Engineering [2]	1-4
MME 595	Introduction to Applied Nonlinear Dynamics [1]	3
CPB/MME 612	Engineering Analysis	3

[1] Students who have taken the 400-level version of this course or its equivalent must select from among other concentration/elective courses.

[2] Student can take special topics which are pre-approved by the department for graduate level courses

Elective Courses

Students select elective courses in consultation with their faculty advisor. If a course does not appear on this list, it can be approved through a petition to the MME department.

Code	Title	Credit Hours
MME 613	Computational Fluid Dynamics	3
MME 615	Advanced Vibration	3
MME 621	Finite Element Analysis	3
MME 623	Mechanical Behavior of Materials	3
CPB 512	Chemical Engineering Thermodynamics [1]	3
CPB 514	Mass Transfer and Unit Operations [1]	4
CPB 518	Biological Transport Phenomena [1]	4
CPB 519	Biomaterials [1]	3
CPB 524	Musculoskeletal Biomechanics	3
CPB 611	Transport Phenomena in Engineering	3
CSE 543	High Performance Computing & Parallel Programming [1]	3
CSE 616	Simulation of Physical Systems	3
ECE 525	Digital Signal Processing [1]	3
ECE 601	State Variables for Engineers	3
MTH 532	Optimization [1]	3
MTH 535	Mathematical Modeling Seminar [1]	3
MTH 632	Advanced Optimization	3
PHY 537	Intermediate Thermodynamics and Introduction to Statistical Physics [1]	4
PHY 551	Classical Mechanics [1]	4
PHY 583	Mathematical Methods in Physics [1]	4
STA 501	Probability [1]	3
STA 504	Advanced Data Visualization [1]	3
STA 563	Regression Analysis [1]	4
STA 566	Experimental Design Methods [1]	4

[1] Students who have taken the 400-level version of this course or its equivalent must select from among other concentration/elective courses.