



# Molten Metal Processing

## ISE 5502

**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

Graduate

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**Course Components:**

Lecture

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**Course Description:**

An advanced class in application of thermodynamics, kinetics, and macro-transport phenomena to primary metals production, refining, and solidification processing.

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**Prerequisites and Co-requisites:**

Prereq: MatScEn 2251 or 3151; or Grad standing; or permission of instructor.

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**Course Goals / Objectives:**

- Students will learn extraction, refining, and processing of metals. Students will learn solidification science and technology.
  - Students will learn metal casting science and technology. Students will learn recycling of metals. Students will learn numerical simulation of casting processes.
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**Course Topics:**

- Introduction to process modeling in the liquid state.
  - Balance equations; heat conduction, steady state and transient
  - Flow of Newtonian and non-Newtonian liquids in manufacturing processes.
  - Application to polymer processing: extrusion, injection molding, compression molding.
  - Application to metal processing: gravity, lost-wax, lost-foam, and die casting processes. Solidification and phase diagrams.
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**Designation:**

Elective