Course of Study Guide for the M.S.N.E. Degree Thesis Option (30 Credits)

**Core – 12 credits**  Selected from the following list. *(All classes are 3 credit hours unless noted)*
- NE 450  Principles of Nuclear Engineering
- NE 501  Seminar (1 cr., 2 cr. are required)
- NE 544  Reactor Analysis (statics and kinetics)
- NE 554/Phys 506  Radiation Detection and Shielding
- NE 565  Reactor Engineering
- NE 585  Nuclear Fuel Cycles
- NSEN 447  Nuclear Systems Laboratory (ISU)

**Focus Areas – 12 Credits**  Selected from the following list.

- **Reactor Engineering, Control & Safety Focus**
  - CHE/ME 527  Thermodynamics
  - CE/ME 519  Fluid Transients
  - CE 541/ME 583  Reliability of Engineering Systems
  - ChE/ME 541  Advanced Engineering Analysis
  - CS 430  System Modeling and Simulation
  - ECE 470/ME 481  Control Systems
  - MATH 480  Partial Differential Equations
  - ME 435  Thermal Energy System Design
  - ME 477/577  Design for Manufacture Assembly
  - ME 520/ME 532  Fluid Dynamics
  - ME 546  Convective Heat Transfer
  - ME/ChE 525  Advanced Heat Transfer
  - NE 462  Nuclear Reactor Codes and Standards
  - NE 525  Transport Theory
  - NE 530  Two Phase Flow
  - NE 575  Advanced Nuclear Power Engineering

- **Reactor Fuels, Chemical Engineering & Chemistry, and Materials Focus**
  - ChE 423  (Chemical) Reactor Kinetics and Design
  - ChE 480/580  Engineering Risk Assessment Hazardous/Radioactive Waste
  - ChE 529  Chemical Engineering Kinetics
  - ChE/ME 515  Transport Phenomena
  - ChE/Me 528  Advanced Thermodynamics
  - MSE 415  Materials Selection and Design
  - MSE 423/523  Corrosion
  - MSE 428/528  Advanced Engineering Ceramics
  - MSE 534  Radiation Effects in Materials
  - MSE/ME 535  Failure of Structural Materials
  - MSE 550  Nuclear Reactor Fuels
  - NE 570  Nuclear Chemical Engineering
  - NE 580  Waste Management and Nuclear Fuel Reprocessing
  - NE 581  Treatment of Radioactive Wastes
  - NE 582  Spent Nuclear Fuel Management and Disposition

- **Individualized Option**  – custom develop your own *(15 credit hours of approved study)*

- **Thesis Research** - NE 500 Masters Research & Thesis (6 credit hours)

Advanced Math, Science, or Engineering courses may be used as technical electives with approval of the student’s committee. This degree is a minimum of 30 semester hours. Students may transfer in up to 12 graduate credits completed at other accredited universities, subject to university regulations and the approval of the student’s graduate committee members. Students must have at least 3 courses (9 credits) in a single focus area to demonstrate depth in study.