

# MIT Department of Nuclear Science and Engineering

## LGO Engineering Degree Requirements

### NSE Requirements:

66 units of graduate subjects.

- Two graduate modules (12 units)
- Two Specialization subjects (24 units)
- Free Engineering Elective (6 or more units, must graduate level)
- Two LGO subjects: 15.087 + 15.066
- Undergraduate subjects, English proficiency subjects, independent study and professional development coursework (22.901-22.904, 22.93) and research subjects (thesis and 22.94) may not be counted.

36 of the 66 units must be taken within the NSE Department.

- Two modules (selected from 22.11, 22.12, 22.13, 22.14, 22.15, 22.16) are required. These 12 units constitute part of the 36 unit NSE subject requirement.
- Two specialization courses in NSE are required (24 units).

Specialization Subjects (part of the 36 NSE subject requirement):

- Nuclear Reactor Engineering: 22.211, 22.312, 22.39, 22.313, 22.315
- Nuclear Reactor Physics: 22.211, 22.312, 22.212, 22.213, 22.251
- Nuclear Materials: 22.71, 3.20, 22.73, 22.74, 22.76, 3.21
- Fusion: 22.611, 22.62, 22.63, 22.612, 22.615, 22.616, 22.67
- Nuclear Science and Technology: 22.51, 8.511, 22.90, 8.333, 8.421
- Nuclear Security and Policy: 6.3702, 22.90, specialist subject by petition
- Energy Economics: 22.811, 14.444
- Students wishing to pursue a unique specialization may submit a petition to the Graduate Chair.

Cumulative GPA of 3.5 exclusive of thesis is required to qualify for the Master's degree.

- Average of coursework + thesis must also be at least 3.5.

Master's Thesis (see below for more information) – 15.ThG

- Must have an NSE faculty member as a research co-advisor, as well as a Sloan research advisor, in accordance with LGO rules.
- A *thesis prospectus* must be submitted during the first term that a student is registered for thesis.
- The thesis will be based on the LGO internship experience.

### Self-Evaluation Exam

All incoming graduate students are expected to take the self-evaluation exam, in order to determine which coursework is appropriate for the Fall term. It is acceptable for incoming graduate students to enroll in 1-2 undergraduate subjects should their self-evaluation indicate that they could use strengthening in that area of the curriculum, or if their prior studies did not include an area of nuclear science and engineering (many students come from non-nuclear educational backgrounds). The undergraduate subjects will not count toward the degree requirements, but if taken for a letter grade, will count toward the cumulative GPA. Taking an undergraduate class as a Listener is also permitted.

## NSE Master of Science Degree Requirements

Last update: June 16, 2023

Students should plan programs of study with their Registration Officer, keeping in mind prior educational background and principal professional interests.

### ***Thesis Prospectus***

Each thesis student is required to turn in one copy of a brief (5-10 pages) thesis prospectus to the Department Academic Office by the end of the eighth week of the first term of Master's thesis registration. Thesis registration may be cancelled if this requirement is not satisfied.

The prospectus should be a clear and well-organized preliminary report. It should contain:

- (1) an introduction to the subject, giving a brief general statement of the field of interest and a concrete statement of the limited area of work which it is intended to undertake;
- (2) a review of relevant background information;
- (3) the proposed method of solution;
- (4) a tentative time schedule for completion of the work;
- (5) the name of the faculty member who will act as research advisors.
- (6) Signatures or electronic approval of research advisors to indicate approval of the proposed research project. Either the research advisor or the reader must be a member of the faculty of the Nuclear Science and Engineering Department.

### ***Thesis Submission***

Please see LGO rules regarding thesis submission. An electronic copy of the thesis should also be submitted to the NSE Academic Office. Copies of the final thesis should also be distributed to your research committee, sponsor and/or fellowship donor, in whatever format they prefer.

### ***Use of Publications in the Thesis Document***

Students who wish to incorporate prior publications into their thesis can include publications as appendices in the thesis (with permission from the publisher), and can cite them extensively. However, it is necessary to maintain a consistent voice and single authorship in the PhD thesis. Most papers are multi-authored, including the student's advisor. It is hard to separate who wrote what. PhD thesis must be single-authored by the student. So, unless the publications are truly single-authored by the student alone, they cannot form the main chapters. It is also necessary for a thesis to have a "grand theme" and a consistent notation. Just putting together papers of disparate topics together without the linkages is not acceptable. It is important to ensure there are enough technical details in the thesis - because of page limitations, most papers are more concise than thesis. NSE expects a thesis that is detailed enough. Students are in no way obligated to include prior publications in the thesis.