**Course number and name: MTSE 4090: Senior Research Project I**

**Credits and contact hours:** 2 Credits. Between 8 am and 5 pm, Monday to Friday, Department of Materials Science and Engineering, Discovery Park, UNT.

**Instructor’s or course coordinator’s name**: All Department Faculty

**Text book, title, author, and year**

None required.

1. *Other supplemental materials*

None

**Specific Course Information**

1. *Brief description of the content of the course (catalog description)*

Provides students with experience in research and development. Students pick a faculty mentor for this class and attend bi-weekly meetings with the other students to discuss progress, strategies, outcomes, etc. Designed primarily for the students to do a literature survey on the selected topic and a research plan to be initiated either late in the semester or in the follow-on course in the subsequent semester.

1. *Prerequisites or co-requisites*

[MTSE 3010](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt1653) , [MTSE 3020](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt8063) , [MTSE 3030](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt6141) , [MTSE 3040](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt9647) , [MTSE 3050](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt6102) , [MTSE 3070](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt5510) , [MTSE 3080](http://catalog.unt.edu/preview_entity.php?catoid=5&ent_oid=288&returnto=257#tt9658) .

1. *Indicate whether a required, elective, or selected elective course in the program*

Required

**Specific goals for the course**

1. *Specific outcomes of instruction*

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| **Specific Course Learning Outcome** |
| 1. Students are expected to function in an environment that is more similar to that which they will encounter in their careers outside the university setting. As such, instructors have two main functions: to serve as advisors to the senior design student/teams and as evaluators of student/team progress.
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| 1. Students are *expected to operate effectively either as an individual or in a team environment*; team evaluations will be compiled at the end of the semester using the attached rubric.
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| 1. The student will identify and describe a design problem with the help of the faculty mentor, and must demonstrate an ability to apply and integrate knowledge of material structure, properties, processing and performance for a materials selection and design problem.
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| 1. The student will demonstrate an ability to perform a literature review in order to become familiar with the current state of the subject.
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| 1. The student will demonstrate ability to present technical information clearly in both oral and written formats.
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| 1. Students must consider additional aspects such as the economic, environmental, ethical, safety as well as social and political impacts of the effort.
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| 1. Students must demonstrate ethical principles in an engineering context.
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1. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes that are addressed by the course.*

This course addresses ABET Student Outcomes 1, 2, 3, 4, 5, 7.

**Brief list of topics to be covered**

1. Laboratory Safety
2. Ethics, environmental sustainability and economic impact of materials science and engineering research.
3. Selection and definition of projects.
4. How to perform a literature review.