The Master of Science in Translational Research (MSTR) provides students with in-depth instruction in the fundamental skills, methodology and principles necessary to become a well-trained translational investigator. The program is designed to meet this objective through the provision of didactic course work, a formal mentorship program, laboratory training, a professional development core, and specific ongoing guidance with hands-on exposure to protocol and grant development. The MSTR is housed within the Institute for Translational Medicine and Therapeutics (ITMAT) which supports research at the interface of basic and clinical research focusing on developing new and safer therapeutics.

The MSTR is designed to facilitate training and research particularly from proof of concept in cellular and animal model systems across the translational divide to proof of concept and dose selection in humans. Student projects and career goals align across this continuum. Students enroll in a core set of courses and also choose an academic pathway to concentrate in a specific area of translational science.

**Concentrations**

- **Discovery:** For students who are elucidating the basic pathophysiological etiology and/or process of disease. Projects may be proof of concept in cell or animal models or human samples.

- **Translational Therapeutics and Regulatory Science:** For students who are testing discoveries for preclinical and/or clinical effect. Projects may be first in humans, phase 1, or assessing the safety, efficacy, quality, and performance of regulated products.

- **Entrepreneurial Science:** For students who aim to navigate both business and academic environments as you conduct research and consider commercialization opportunities.

- **Bioinformatics/Biomedical Informatics:** For students who are adopting informatics methodologies to develop and test their own hypotheses.

For more information: [https://www.itmat.upenn.edu/itmat/education-and-training/master-of-science-in-translational-research/](https://www.itmat.upenn.edu/itmat/education-and-training/master-of-science-in-translational-research/)

**Curriculum**

Students must complete 12 course units and achieve a B- or higher in each course for the degree.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 600</td>
<td>Introduction to Biostatistics</td>
<td>1</td>
</tr>
<tr>
<td>MTR 601</td>
<td>Review Writing</td>
<td>1</td>
</tr>
<tr>
<td>MTR 602</td>
<td>Proposal Development</td>
<td>1</td>
</tr>
<tr>
<td>MTR 603</td>
<td>Disease Measurement</td>
<td>1</td>
</tr>
<tr>
<td>MTR 604</td>
<td>Scientific &amp; Ethical Conduct</td>
<td>1</td>
</tr>
<tr>
<td>MTR 605</td>
<td>Data Manuscript Writing</td>
<td>1</td>
</tr>
<tr>
<td>MTR 999</td>
<td>Master of Science in Translational Research LAB</td>
<td>1</td>
</tr>
</tbody>
</table>

**Concentration**

Select a concentration below and complete the required courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total Course Units**

12

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bioinformatics/Biomedical Informatics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Entrepreneurial Science**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bioinformatics/Biomedical Informatics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Translational Therapeutics and Regulatory Science**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bioinformatics/Biomedical Informatics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Translational Therapeutics and Regulatory Science**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bioinformatics/Biomedical Informatics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Translational Therapeutics and Regulatory Science**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

**Translational Therapeutics and Regulatory Science**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 607</td>
<td>Thesis I</td>
<td>1</td>
</tr>
<tr>
<td>MTR 608</td>
<td>Thesis II</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplemental Core**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMG 867</td>
<td>Health Care Entrepreneurship</td>
<td>0.5</td>
</tr>
<tr>
<td>MTR 640</td>
<td>Seminar in Entrepreneurial Science</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTR 535</td>
<td>Introduction to Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>or BMIN 503</td>
<td>Data Science for Biomedical Informatics</td>
<td>1</td>
</tr>
</tbody>
</table>

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2021 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.