The use of computational modeling tools is ubiquitous in materials research. The Computational Materials minor provides a fundamental graduate education in materials simulation techniques. The course work:

1. provides foundational courses in materials modeling, offered at various length scales,
2. integrates both broad foundational courses for students interested in a wide range of modeling techniques and/or specialized courses allowing students to develop depth in a specific modeling technique/scale, and
3. provides a flexible set of electives that will assure students are exposed to materials-related phenomena in their area of expertise.

The minor provides students the recognition of having built a background in Computational Materials, as well as the access and oversight of faculty in the minor to help them integrate these concepts with their doctoral research.

**Admission Requirements**

Admission to the minor will require completion of a first core course in the minor, approval from the student’s major Graduate Program Head/Graduate Program Chair/Director of Graduate Studies or Professor-in-Charge, and submission of a minor plan of study (listing intended courses by semester and approved by the student’s intended minor faculty dissertation committee member) submitted to the MATSE department graduate program coordinator. A form for the minor plan of study and its approval is available from the graduate minor program. Graduate students in good standing (with current graduate GPA at or above 3.0) who have approval and who have completed a minor core course with a grade of B or higher will be admitted to the minor.

**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The doctoral minor consists of no fewer than 15 credits, 9 credits of which must be from a list of core minor courses, and 6 credits of which are elective courses. A minimum of 6 credits must be at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 565</td>
<td>Quantum Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 566</td>
<td>Quantum Chemistry II</td>
<td>3</td>
</tr>
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</table>

**Core Minor Courses**

Select 9 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 561</td>
<td>Quantum Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 512</td>
<td>Quantum Theory of Solids I</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 419</td>
<td>Computational Materials Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 544</td>
<td>Computational Materials Science of Soft Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 580</td>
<td>Computational Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 581</td>
<td>Computational Materials Science II: Continuum, Mesoscale Simulations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 6 credits from list of electives

**Total Credits**

A list of elective courses is maintained by the Department of Materials Science and Engineering. The Department also maintains a list of faculty who may represent the minor on dissertation committees. The minor is only available to doctoral students. Official requests to add a minor to a doctoral student’s academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate’s dissertation committee.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Campus**

University Park

**Graduate Program Head**

Susan B Sinnott

**Program Contact**

Hayley Jane Colyer
221 Steidle Building
University Park PA 16802
hjc24@psu.edu
(814) 865-0498

**Program Website**

View (https://www.matse.psu.edu/degree-programs/graduate/computational-materials-doctoral-minor)