CHEMICAL PHYSICS - M.S.

College of Arts and Sciences
Chemical Physics Interdisciplinary Program
Liquid Crystal and Materials Science Building
Kent Campus
330-672-2654
www.kent.edu/cpip

Description
The Chemical Physics Interdisciplinary Program at Kent State University provides graduate students with extensive scientific training, cutting-edge research opportunities and engineering skills necessary for a variety of careers in the academy and in industry. Program faculty and students conduct research in Kent State's Liquid Crystals Institute in liquid crystal synthesis and molecular design, liquid crystal materials and properties, lyotropic liquid crystals and bio-related materials, optoelectronics, and nanoscience and nanotechnologies. These important research foci are inherently interdisciplinary.

The Liquid Crystal Engineering concentration offers a two-year curriculum leading to the M.S. degree with a focus on practical learning combining both lecture and laboratory coursework. This degree program responds to the growing need for skilled engineers with expertise in liquid crystals by providing students with opportunities to learn the basic sciences; modelling and simulation; electronic and optical design; fabrication and testing of displays, electro-optic devices, sensing devices and applied systems in the advanced facilities of Kent State University’s Liquid Crystal Institute. Graduate students will acquire practical skills as well as working knowledge of the fundamental science and technology needed in the cutting-edge liquid crystal industry. This program has been developed by world-renowned liquid crystal scientists at the Liquid Crystal Institute, together with engineers and technology specialists from industry.

FULLY OFFERED AT:
• Kent Campus

Admission Requirements
• Official transcript(s)
• Goal statement
• Two letters of recommendation
• Submission of GRE tests (general and subject test—physics or chemistry) is not required, but strongly recommended
• Admission will be granted by examination of the student’s background on an individual basis. Students from a variety of undergraduate majors, such as physics, chemistry, engineering and materials science are invited to apply to the Chemical Physics Interdisciplinary Program
• English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following (effective spring 2018):
  • Minimum 525 TOEFL score (paper-based version)
  • Minimum 71 TOEFL score (Internet-based version)
  • Minimum 74 MELAB score
  • Minimum 6.0 IELTS score

• Minimum 50 PTE score

For more information about graduate admissions, please visit the Graduate Studies website. For more information on international admission, visit the Office of Global Education’s admission website.

Program Learning Outcomes
Graduates of this program will be able to:

1. Develop an advanced understanding of the fundamental science of liquid crystals and ability to apply acquired knowledge of physical and chemical properties of liquid crystals in achieving development of liquid crystal materials and devices.
2. Gain experience in presenting scientific data in research publications, articles, posters and oral presentations.
3. Apply acquired knowledge to the development of new liquid crystal materials, new theories and effects, and liquid crystal based devices.

Program Requirements
Major Requirements

<table>
<thead>
<tr>
<th>Major Requirements</th>
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<tbody>
<tr>
<td>CPHY 62450</td>
<td>LIQUID CRYSTAL OPTICS I: THEORY</td>
</tr>
<tr>
<td>CPHY 62452</td>
<td>LIQUID CRYSTAL OPTICS II: OPTICAL SYSTEMS</td>
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<td>CPHY 62460</td>
<td>LIQUID CRYSTAL MATERIALS SCIENCE</td>
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<td>CPHY 62462</td>
<td>LIQUID CRYSTAL SCIENCE: PHYSICAL PROPERTIES</td>
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Approved Elective

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<td>CPHY 62335</td>
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<td>CPHY 62241</td>
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<tr>
<td>CPHY 64491</td>
<td>SEMINAR: LIQUID CRYSTALS</td>
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Minimum Total Credit Hours: 30-38

Additional Major Requirements

[AS-MS-CPHY]

Students declaring the Liquid Crystal Engineering concentration should instead take the requirements listed under that concentration.

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Choose from the following: 6

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Liquid Crystal Engineering Concentration

**REQUIREMENTS**

[AS- MS-CPHY-LCE]

**Concentration Requirements**

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<tr>
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**Minimum Total Credit Hours:** 26

¹ One credit per semester.

**Graduation Requirements**

- A total of 30 credit hours beyond the baccalaureate degree are required to earn the Master of Science in Chemical Physics. Students are required to complete 12 credit hours of core courses and 18 credit hours of electives selected in consultation with the student's faculty advisor. Elective credit hours may include research and thesis. Students in the Liquid Crystal Engineering concentration must earn a total of 38 credit hours beyond the baccalaureate degree. Students are required to take 29 credit hours of coursework (12 credit hours in the core and an additional 17 credit hours for specific concentration requirements), 6 credit hours of a master's project (CPHY 65098) and 3 credit hours of electives selected in consultation with the student's faculty advisor.

**Thesis**

- Candidates may choose to do a master's thesis by registering for CPHY 60199 for a total of 6 credit hours. The thesis for the Master of Science degree will present and interpret results of original research and must be defended before a committee of the Chemical Physics graduate faculty.