MATERIALS SCIENCES - M.S.

Contact Information
• Program Director: Antal Jakli | ajakli@kent.edu | 330-672-4886
• Chat with an Admissions Counselor

Fully Offered
• Kent Campus

Admission Terms
• Fall

Examples of Possible Careers*
Computer and information research scientists
• 15.4% much faster than the average
• 32,700 number of jobs
• $126,830 potential earnings

Physical scientists, all other
• -3.0% decline
• 22,800 number of jobs
• $107,210 potential earnings

Physicists
• 7.3% faster than the average
• 18,200 number of jobs
• $129,850 potential earnings

Materials scientists
• 3.4% about as fast as the average
• 7,000 number of jobs
• $99,460 potential earnings

Biochemists and biophysicists
• 4.0% about as fast as the average
• 34,600 number of jobs
• $94,270 potential earnings

Biological scientists, all other
• 2.2% slower than the average
• 44,700 number of jobs
• $85,290 potential earnings

Chemists
• 4.7% about as fast as the average
• 86,700 number of jobs
• $79,300 potential earnings

Chemical engineers
• 4.4% about as fast as the average
• 32,600 number of jobs
• $108,540 potential earnings

*Note
Source of occupation titles and labor data is from the U.S. Bureau of Labor Statistics’ Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

Description
The Master of Science degree in Materials Science provides students with extensive scientific training, cutting-edge research opportunities and engineering skills necessary for a variety of careers in academy and industry. Program faculty and students conduct research through Kent State’s participating departments and the Advanced Materials and Liquid Crystal Institute. Such research includes liquid crystal synthesis and molecular design; properties of liquid crystals and related advanced materials; lyotropic liquid crystals and bio-related materials; opto-electronics; and nanoscience and nanotechnologies. These important research foci are inherently interdisciplinary.

Admission Requirements
• Bachelor’s degree from an accredited college or university for unconditional admission
• Minimum 3.000 undergraduate GPA on a 4.000 point scale for unconditional admission
• Official transcript(s)
• Goal statement
• Two letters of recommendation
• Submission of GRE scores (general and subject test in physics or chemistry) is not required, but strongly recommended
• English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following:
  • 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

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.

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 soft materials and ability to apply acquired knowledge of physical and
chemical properties of advanced soft materials and devices such as liquid crystals, polymers, colloids and active matter.

2. Gain experience in presenting scientific data in research publications, articles, posters and oral presentations.

3. Apply acquired knowledge to the development of new soft materials, new theories and effects and advanced materials such as liquid crystal-based devices.

**Program Requirements**

**Major Requirements**

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<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MTSC 62242</td>
<td>CHARACTERIZATION OF SOFT MATTER</td>
<td>3</td>
</tr>
<tr>
<td>MTSC 63000</td>
<td>PHYSICS OF SOFT MATTER</td>
<td>3</td>
</tr>
<tr>
<td>MTSC 63015</td>
<td>CHEMISTRY OF SOFT MATTER</td>
<td>3</td>
</tr>
<tr>
<td>MTSC 63020</td>
<td>APPLICATIONS OF SOFT MATTER</td>
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Approved Electives, choose from the following: 12

- BSCI 50158 MOLECULAR BIOLOGY
- BSCI 50220 BIOINFORMATICS
- BSCI 51120 BIOLOGICAL LIGHT MICROSCOPY
- CHEM 50352 INORGANIC MATERIALS CHEMISTRY
- CHEM 50451 ORGANIC MATERIALS CHEMISTRY
- CHEM 50478 SYNTHESIS OF ORGANIC LIQUID CRYSTALS
- CHEM 50559 NANOMATERIALS
- CHEM 50571 SURFACE CHEMISTRY
- CHEM 60254 BIOMEMBRANES
- CHEM 62691 SEMINAR: INDUSTRIAL CHEMISTRY
- MTSC 60498 RESEARCH
- MTSC 62241 STATISTICAL MECHANICS OF SOFT MATTER
- MTSC 62249 LABVIEW FOR DATA ACQUISITION AND INSTRUMENT CONTROL
- MTSC 62335 ADVANCED LIQUID CRYSTALLINE AND POLYMERIC MATERIALS
- MTSC 62450 LIQUID CRYSTAL OPTICS I: THEORY
- MTSC 62452 LIQUID CRYSTAL OPTICS II: OPTICAL SYSTEMS
- MTSC 62460 LIQUID CRYSTAL MATERIALS SCIENCE
- MTSC 62462 LIQUID CRYSTAL SCIENCE: PHYSICAL PROPERTIES
- MTSC 62640 LIQUID CRYSTAL, POLYMER AND COLLOID COMPOSITES
- MTSC 62643 ELECTRO-OPTICS OF LIQUID CRYSTALS: MODELING AND DEVICE DESIGN
- MTSC 62647 STRUCTURED FLUIDS
- MTSC 62650 COMPUTATIONAL MATERIALS SCIENCE
- MTSC 62651 NANOBIOTECHNOLOGY
- MTSC 63010 LIYOTROPIC LIQUID CRYSTALS
- MTSC 63025 ACTIVE MATTER
- MTSC 63100 EMERGING DISPLAY TECHNOLOGIES
- MTSC 64491 SEMINAR: LIQUID CRYSTALS
- MTSC 64495 SPECIAL TOPICS IN CHEMICAL PHYSICS
- MTSC 65006 LIQUID CRYSTAL DEVICE PROTOTYPING
- MTSC 65008 LIQUID CRYSTAL DEVICE CONSTRUCTION
- MTSC 65032 SCIENTIFIC COMMUNICATION
- PHY 66403 ADVANCED CONDENSED MATTER PHYSICS
- PHY 68401 LIQUID CRYSTAL PHYSICS

Additional courses with advisor approval

**Culminating Requirement**

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<tr>
<td>MTSC 60199</td>
<td>THESIS I ¹</td>
<td>6</td>
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<tr>
<td>or MTSC 65098</td>
<td>MASTER'S PROJECT: ENGINEERING APPLICATIONS OF LIQUID CRYSTALS</td>
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Minimum Total Credit Hours: 30

¹ Candidates selecting to complete the thesis will present and interpret results of original research that must be defended before a committee of the materials science graduate faculty. Upon approval of the thesis topic, the student is required to register continuously for MTSC 60199 each semester for a total of 6 credit hours. A student who has completed the required 6 credit hours of MTSC 60199 but has not finished the thesis is expected, thereafter, to register continuously for MTSC 60299 each semester until all degree requirements are met. No more than 6 credit hours of MTSC 60199 may be counted toward completion of degree requirements. Credit hours earned in MTSC 60299 do not, under any circumstances, count toward the degree.