MATERIALS SCIENCE - M.S.

College of Arts and Sciences
www.kent.edu/materials-science

About This Program
The M.S. Materials Science program offers a comprehensive curriculum and cutting-edge research opportunities in materials science. With experienced faculty and access to state-of-the-art facilities, you'll be prepared for a successful career in this field. Read more...

Contact Information
• Program Director: Antal Jakli | msgpdirector@kent.edu | 330-672-3899
• Connect with an Admissions Counselor: U.S. Student | International Student

Program Delivery
• Delivery:
  • Kent Campus
• Location:
  • In person

Examples of Possible Careers and Salaries*

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

* Source of occupation titles and labor data comes 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.

For more information about graduate admissions, visit the graduate admission website. For more information on international admissions, visit the international admission website.

Admission Requirements
• Bachelor’s degree from an accredited college or university
• Minimum 2.750 undergraduate GPA on a 4.000 point scale
• Official transcript(s)
• Goal statement
• Résumé or curriculum vitae
• Two letters of recommendation
• 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
  • Minimum 71 TOEFL score
  • Minimum 74 MELAB score
  • Minimum 6.0 IELTS score
  • Minimum 50 PTE score
  • Minimum 100 Duolingo English score

Submission of GRE scores (general and subject test in 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.

Application Deadlines
• Fall Semester
  • Priority deadline: January 15
    Applications submitted by this deadline will receive the strongest consideration for admission.
Program Requirements

Major Requirements

<table>
<thead>
<tr>
<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>
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<tr>
<td>MTSC 63015</td>
<td>CHEMISTRY OF SOFT MATTER</td>
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<tr>
<td>MTSC 63020</td>
<td>APPLICATIONS OF SOFT MATTER</td>
<td>3</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 NANOBIOENGINEERING
MTSC 63010 lyOTROPIC 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

MTSC 60199 THESIS I 1 6

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.

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.

Full 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.