

MATERIALS SCIENCES - M.S.

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

Contact Information

- Program Director: **Antal Jakli** | ajakli@kent.edu | 330-672-3899
- Chat with an Admissions Counselor

Fully Offered

- **Delivery:**
 - Kent Campus
- **Location:**
 - In person

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
- Minimum 2.750 undergraduate GPA on a 4.000 point scale
- Official transcript(s)
- Goal statement
- Effective for spring 2023 admission, a résumé or curriculum vitae will be required
- 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
 - Minimum 100 Duolingo English test 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

Code	Title	Credit Hours
Major Requirements		
MTSC 62242	CHARACTERIZATION OF SOFT MATTER	3
MTSC 63000	PHYSICS OF SOFT MATTER	3
MTSC 63015	CHEMISTRY OF SOFT MATTER	3
MTSC 63020	APPLICATIONS OF SOFT MATTER	3
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	NANOBIO TECHNOLOGY	
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		
<i>Culminating Requirement</i>		
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.