



Achieve More. **Together.**



COMPUTER SCIENCE, INFORMATION SECURITY & DATA SCIENCE

GRADUATE PROGRAMS

Computer Science, M.S. | Information Security – Technical Concentration, M.S. | Data Science, M.S. |
Computational Biology and Bioinformatics Certificate | Data Science Certificate

Opportunity abounds for those with the skills and drive to advance how we store, utilize and protect information.

In today's data-driven economy, innovations in information security have become key pillars as sources of growth. Large data sets are becoming core assets in organizations. As its importance increases, the need for better systems with improved processes and the ability to work autonomously will become even more important. Those who possess the skills to create these systems, as well as those who know how to analyze and protect information, will be vital to an organization's stability. At Lewis University, we've designed programs that'll provide you with the technical skills and problem-solving strategies necessary for a wildly successful career. Through our state-of-the-art networking and security lab, latest versions of commercial and open-source software, and reputation for excellence in the industry, we've earned national recognition as a Center of Academic Excellence in Information Assurance Education by the Department of Homeland Security (DHS) and the National Security Agency (NSA). Coupled with experienced faculty who are experts in their field, we have everything you need to enjoy an enriching career as a graduate of one of the following programs:

- Computer Science (M.S.)
- Information Security – Technical Concentration (M.S.)
- Data Science (M.S.)
- Computational Biology and Bioinformatics Certificate
- Data Science Certificate



Earn your degree your way.

We know that juggling work, family and education can be challenging. So we offer adult and graduate programs in evening, online, accelerated and blended (online and on-campus) formats at conveniently located campuses* throughout the Chicagoland area – all designed with you in mind. Our graduate and certificate programs are available online or in a face-to-face classroom format.

**Class locations and offerings differ between programs.*

Questions?

Call **(815) 836-5610** or
e-mail grad@lewisu.edu

MASTER OF SCIENCE IN Computer Science

Utilize existing systems to create the technologies of tomorrow.

Conduct industry-relevant research that pushes fundamental theories into reality.

Technology connects us with the world and presents new opportunities to grow and advance. Those who truly understand its potential are the ones who will push its boundaries, and prepare people and businesses to meet the challenges of tomorrow. With a Master of Science in Computer Science from Lewis University, you'll have the advanced skills to help redefine how businesses and industries will work through faster systems, advanced algorithms and secure data while creating new career opportunities for yourself. You will learn to:

- Develop and implement efficient, scalable and secure software systems
- Design, execute and evaluate network-based distributed systems, components and applications that interact with their environment
- Evaluate and enhance the security of information systems against zero-day cyber-attacks
- Create solutions that collect, communicate, visualize, process, store and secure large volumes of actionable data
- Integrate custom hardware and software to create systems that automate and improve diverse processes
- Conduct industry-relevant Computer Science research



US News & World Report's ranking of jobs shows that four of the five best STEM jobs are Computer Science positions. And, according to the Bureau of Labor Statistics, even at the most highly educated end of the employment spectrum for Computer Scientists – the role of the Computer and Information Research Scientists, who require a doctorate or professional degree for entry and perform some of the industry's most specialized functions – the growth rate in new job opportunities is 15%.

In order to ensure your degree program matches your career and professional interests, we offer the following concentrations you can choose from:

Software Engineering

- Develop software for a variety of platforms and systems
- Design data storage systems that meet the requirements of a given problem, including prescribing the necessary hardware, software and communication links
- Design, implement, document and present a computer system for a particular application
- Use today's popular languages and frameworks to create mobile, web and desktop applications

Cyber Security

- Identify the risks an organization faces due to cyber threats and recommend steps to combat them
- Create new responses to emerging cyber security problems
- Create tools for encrypting data, authenticating users and verifying the integrity of data
- Identify components of a modern information system and the threats that challenge security
- Design software and networks that resist and mitigate cyber-attacks
- Reverse engineer malware to determine how to defeat it
- Extract and examine digital evidence from diverse platforms and media

Intelligent Systems

- Design and implement intelligent systems that perceive, act and learn in response to their environment
- Utilize machine-learning techniques to improve the performance of systems
- Derive experience-based models for solving problems
- Integrate software with hardware to create autonomous systems that can do useful work
- Create secure networks for communicating measurement data and commands among devices
- Create software that performs required computation while minimizing battery usage and processing lag

Life after Lewis

Upon graduation from this program, you can potentially bring your new skills to the following areas:

- Software Developer
- Database Designer
- Web Developer
- Network Engineer
- Cyber Security Engineer
- Cloud Computing Architect
- Video Game Developer
- Simulation Expert

MASTER OF SCIENCE IN Computer Science

Degree Requirements

Degree Offered: *Master of Science in Computer Science*

Total Credit Hours Required: **32-45**

I. FOUNDATION COURSES (13)

CPSC-50100	Programming Fundamentals
CPSC-50200	Discrete Structures
CPSC-50300	Algorithms and Data Structures
CPSC-50400	Computer Architecture

II. CORE COURSES (14)

You must take a core curriculum that ensures you are knowledgeable in Programming, Systems and Theory. You will take at least one course in each of these three areas and choose one area in which you will take two courses. In addition, you must take the following course within the first 14 credit hours of the program:

CPSC-59700	Research in Computer Science
------------	------------------------------

CORE PROGRAMMING OPTIONS

Choose one or two from the list below. You may not take a course for credit if you've already taken the cross-listed course or its equivalent.

CPSC-51100	Statistical Programming
CPSC-51700	Pervasive Application Development
CPSC-60000	Object-Oriented Design
CPSC-62700	Programming for Penetration Testers
CPSC-62800	Programming for Digital Forensics

CORE SYSTEMS OPTIONS

Choose one or two from the list below. You may not take a course for credit if you've already taken the cross-listed course or its equivalent.

CPSC-51500	Operating Systems and Distributed Systems
CPSC-54000	Large-Scale Data Storage Systems
CPSC-55500	Distributed Computing Systems
CPSC-58000	Communications and Networking
CPSC-65500	Cloud Computing and Virtualization

CORE THEORY OPTIONS

Choose one or two from the list below. You may not take a course for credit if you've already taken the cross-listed course or its equivalent.

MATH-51000	Mathematics for Data Scientists
CPSC-52500	Encryption and Authentication Systems
CPSC-57100	Artificial Intelligence
CPSC-61000	Theory of Computation
CPSC-66000	Programming Languages

III. ELECTIVES (15)

Choose five courses from the list below. You may choose to pursue a concentration which you will earn by taking four of your five electives from that concentration's list. You may not count a course as both a Core Curriculum Course and an Elective. You may not take a course for credit if you've already taken the cross-listed course or its equivalent.

SOFTWARE ENGINEERING CONCENTRATION

CPSC-51700	Pervasive Application Development
CPSC-53000	Data Visualization
CPSC-54000	Large-Scale Data Storage Systems
CPSC-55500	Distributed Computing Systems
CPSC-57100	Artificial Intelligence I
CPSC-57200	Artificial Intelligence II
CPSC-60000	Object-Oriented Design
CPSC-61000	Theory of Computation
CPSC-61500	Computer Graphics
CPSC-62700	Programming for Penetration Testers
CPSC-62800	Programming for Digital Forensics
CPSC-63000	Database Systems
CPSC-65500	Cloud Computing and Virtualization
CPSC-66000	Programming Languages
CPSC-66500	Software Vulnerabilities and Defenses

CYBER SECURITY CONCENTRATION

CPSC-51500	Operating Systems and Distributed Systems
CPSC-52000	Intrusion Detection, Response and Recover
CPSC-52500	Encryption and Authentication Systems
CPSC-54000	Large-Scale Data Storage Systems
CPSC-55500	Distributed Computing Systems
CPSC-56000	Securing Windows
CPSC-56100	Securing Linux
CPSC-58000	Communications and Networking
CPSC-62700	Programming for Penetration Testers
CPSC-62800	Programming for Digital Forensics
CPSC-63000	Database Systems
CPSC-65500	Cloud Computing and Virtualization
CPSC-66400	Wireless Security
CPSC-66500	Software Vulnerabilities and Defenses
CPSC-67000	Cloud and Virtualization Security
CPSC-67300	Advanced Digital Forensics
CPSC-68000	Critical Infrastructure Network Security
CPSC-68500	Enterprise Network Security

INTELLIGENT SYSTEMS CONCENTRATION

CPSC-51000	Introduction to Data Mining and Analytics
CPSC-53000	Data Visualization
CPSC-55000	Machine Learning
CPSC-57100	Artificial Intelligence I
CPSC-57200	Artificial Intelligence II
CPSC-57400	Natural Language Processing
CPSC-61000	Theory of Computation
CPSC-61500	Computer Graphics
CPSC-63000	Database Systems
CPSC-65000	Robotics
CPSC-65500	Cloud Computing and Virtualization

IV. THESIS

CPSC-69700	Master's Thesis
------------	-----------------

Admission Requirements

In order to be accepted into this program, you must possess:

- A baccalaureate degree from a regionally accredited institution of higher education
- A minimum undergraduate GPA of 3.0 on a 4.0 scale
- A completed application for graduate admission with \$40 application fee
- A professional resumé
- Official transcripts from all educational institutions attended
- Two-page statement of purpose
- Two recommendation forms or letters
- Undergraduate coursework in discrete mathematics, programming and algorithms (Students without sufficient coursework will still be considered for admission but may need to complete up to 13 credit hours of foundation courses)
- International students are required to have a TOEFL test score greater than 550 (computer-based 213; Internet-based 79)

**Provisional admission may be granted for those who do not meet these requirements*

MASTER OF SCIENCE IN Information Security

Become the guardian for your company's data.

Learn how to devise and implement strategies that will keep your organization's information secure.

Every day, organizations face increasing challenges to protect their data. To keep it secure, organizations need individuals who can counteract today's threats, as well as anticipate and prepare for tomorrow's. With a Master of Science in Information Security (MSIS) from Lewis University, you will be qualified to do just that. We will provide you with a solid understanding of the:

- Techniques for securing and examining a variety of computing platforms
- Value of IT assets and the risks associated with their loss
- Scientific principles underlying cyber attacks and efforts to counteract them so you can respond to new attacks as they evolve
- Vulnerabilities associated with database systems, web applications and operating systems; how to find them; and how to recover the data from corrupted systems
- Legal, ethical and privacy issues associated with information security

Life after Lewis

Upon graduation from this program, you can potentially bring your new skills to the following areas:

- Information Security Officer
- Security Analyst
- Security Engineer
- Penetration Tester
- Security Architect



Stan Pieklo '14, Field Engineer and Adjunct Instructor
Gradient Telecomm / Joliet Junior College

"Lewis University was a great experience for me. The instructors give you a strong indication of what's going on in the field in the real world. Plus, they're wonderful at taking the time to interact with you. They also work with you around outside issues that come up, so you can still achieve your goals. If I couldn't make it to class, I could e-mail the instructor or watch the live session online. I feel like I have a much broader education going through the MSIS program."

Degree Requirements

Degree Offered: **Master of Science in Information Security – Technical Concentration**
Total Credit Hours Required: **35-41**

I. FOUNDATION COURSES (6)

May be waived based on previous undergraduate coursework

CPSC-50000 Computer Organization
INSY-50100 Principles of Programming

II. CORE COURSES (18)

INSY-50500 Introduction to Information Security
INSY-51000 Data Networking
CPSC-51500 Operating Systems and Distributed Systems
CPSC-52000 Intrusion Detection, Response and Recovery
CPSC-52500 Encryption and Authentication Systems
INSY-53000 Legal and Ethical Issues in Information Security

III. TECHNICAL CONCENTRATION (9-12)

A minimum of three courses from the following:

INSY-52300 Computer Forensics
CPSC-56000 Securing Windows
CPSC-56100 Securing Linux
INSY-59400 Database Management
CPSC-66400 Wireless Security
CPSC-66500 Software Vulnerabilities and Defenses
CPSC-67000 Cloud and Virtualization Security
CPSC-67300 Advanced Digital Forensics
CPSC-68000 Industrial and Critical Infrastructure Network Security

IV. ELECTIVE (0-3)

Choose an additional elective to fulfill 12 credit hours total of coursework.

V. SEMINARS (2)

INSY-59700 Information Security Certification Prep I
INSY-59710 Information Security Certification Prep II

VI. CAPSTONE COURSE (3)

CPSC-59100 Information Security Project: Technical Concentration

Admission Requirements

In order to be accepted into this program, you must possess:

- A baccalaureate degree from an accredited institution of higher learning
- A minimum undergraduate GPA of 3.0 on a 4.0 scale*
- A completed application for graduate admission with \$40 application fee
- A professional resumé
- Official transcripts from all educational institutions attended
- Two-page statement of purpose
- Two recommendation forms or letters
- International students are required to have a TOEFL test score greater than 550 (computer-based 213; Internet-based 79)

**Provisional admission may be granted for those who do not meet these requirements*

MASTER OF SCIENCE IN Data Science

Learn how to mine the big secrets hiding in company data.

Help organizations transform decision making by using the vital information in data to improve processes, relationships and revenues.

Today's organizations are coming to the realization that there are treasure troves of information hidden within their data that, when acted upon, can help them better target and serve their customer base, predict market trends, optimize their processes, identify unmet needs, and much more. But to get to it, they need individuals with the training to create, deploy, and use today's state-of-the-art data mining and predictive analysis tools. Lewis' Master of Science in Data Science program helps prepare these individuals. The Master of Science in Data Science program will prepare you to:

- Design and develop software and systems to store, manage, query, process and interpret big data
- Devise algorithms to identify trends
- Determine how to best display data to communicate actionable recommendations
- Develop an in-depth understanding of the mathematics and computing of data science techniques and technologies
- Use real-time and historical data to solve real-world problems
- Learn to evaluate and compare large-scale and cloud-based storage solutions that meet specific performance, security, query, functional and cost requirements
- Choose appropriate data analysis techniques to solve specific problems

Tyler Owen '14, Managing Consultant
Trustwave

"I travel a lot for work, so Lewis' online MSIS program worked well for me. Even though I attended class remotely, I was still able to attend the live lecture and interact with the instructor. I really enjoyed seeing the practical experience my professors brought to the classroom from working in the field. It's given me a more well-rounded knowledge of the industry, which has allowed me to talk to my customers in a more intelligent manner. And it's made me more confident in what I can do."

Admission Requirements

In order to be accepted into this program, you must possess:

- A baccalaureate degree from an accredited institution of higher learning
- A minimum undergraduate GPA of 3.0 on a 4.0 scale*
- Undergraduate mathematics coursework in Calculus
- A completed application for graduate admission with \$40 application fee
- A professional resumé
- Official transcripts from all educational institutions attended
- Two-page statement of purpose
- Two letters of recommendation
- International students are required to have a TOEFL test score greater than 550 (computer-based 213; Internet-based 79)

**Provisional admission may be granted for those who do not meet these requirements*

Degree Requirements

Degree Offered:

Master of Science in Data Science

Total Credit Hours Required: **36**

I. CORE COURSES (24)

MATH-51000	Mathematics for Data Scientists
MATH-51100	Concepts of Statistics I
CPSC-51000	Introduction to Data Mining and Analytics
CPSC-51100	Statistical Programming
CPSC-52500	Encryption and Authentication Systems
CPSC-53000	Data Visualization
CPSC-54000	Large-Scale Data Storage Systems
CPSC-55000	Machine Learning

II. CONCENTRATION COURSES (12)

Computational Biology and Bioinformatics (12)

BIOL-50900	Introduction to Computational Biology
BIOL-51000	Data Systems in the Life Sciences
BIOL-51200	Research in Biotechnology
BIOL-59000	Data Science Project for Life Scientists

Computer Science (12)

CPSC-59000	Data Science Project for Computer Scientists
------------	--

Plus, choose three of the following:

MATH-51200	Concepts of Statistics II
CPSC-51700	Pervasive Application Development
CPSC-55200	Semantic Web
CPSC-55500	Distributed Computing Systems

Life after Lewis

Upon graduating from the program, you can bring your new skills to the following roles:

- Data Scientist
- Data Analyst
- Data Strategist
- Data Engineer
- Predictive Modeler
- Computer and Information Research Scientist
- Market Research Analyst
- Risk Manager

Certificate in Computational Biology and Bioinformatics

Total Credit Hours Required: **18**

This certificate program will prepare you to specialize in implementing and choosing systems that identify trends in large sets of data for the life sciences. It is designed for those who do not wish to pursue the full degree. However, you can switch over to the full degree program if you wish.

BIOL-50900	Introduction to Computational Biology
BIOL-51000	Data Systems in the Life Sciences
MATH-51000	Mathematics for Data Scientists
CPSC-51000	Introduction to Data Mining and Analytics
CPSC-51100	Statistical Programming
CPSC-53000	Data Visualization

Certificate in Data Science

Total Credit Hours Required: **18**

This certificate is designed for those who wish to acquire general data science skills and knowledge but do not wish to pursue the full degree. However, you can switch over to the full degree program if you wish.

MATH-51000	Mathematics for Data Scientists
CPSC-51000	Introduction to Data Mining and Analytics
CPSC-51100	Statistical Programming
CPSC-53000	Data Visualization
CPSC-54000	Large-Scale Data Storage Systems
CPSC-55000	Machine Learning

Apply Today

Applying to Lewis University is simple:

- Complete the Graduate Application at lewisu.edu/apply.
- Submit the necessary transcripts or supporting documents for your program. Some programs have special admission requirements.
- Submit the \$40 application fee online.

Start taking your career to the next level today!

Why more graduate students choose Lewis

Take a closer look at Lewis and you'll find more than someplace to get your next degree. You'll find a values-based, ethically-focused approach to education from faculty who are experts in their fields. You'll find faculty and staff who understand your need to balance work, family and education and work with you to accomplish your goals. And you'll find a respected, state-of-the-art institution of higher learning that's been recognized by renowned publications, the U.S. government and more. See for yourself:

- Lewis' state-of-the-art Science Center houses some of the most impressive computing resources in the region
- Lewis offers cutting-edge cloud computing resources and software suites
- Lewis is a Department of Homeland Security (DHS)/National Security Agency (NSA) nationally recognized Center of Academic Excellence in Information Assurance Education
- Recently named #1 best private college value in Illinois by Great Value Colleges
- Small, interactive classes so you can grow with your peers led by dedicated faculty who are experts in their field with real-world experience

Let us talk with you about funding your education

We're dedicated to making your degree as affordable as possible. That's why Lewis offers transfer-friendly credit policies, employer tuition discounts and tuition deferral plans. You might also qualify for Federal Stafford Loans, veterans' benefits or scholarships. Put all those pieces together and you'll find that we're one of the most affordable private universities in the Chicago area. To apply for financial aid:

- Submit your application for admission at lewisu.edu/apply.
- Complete the Free Application for Federal Student Aid (FAFSA) at fafsa.ed.gov and use 001707 for Lewis' school code.
- If your FAFSA application is selected for verification, Lewis will request additional documentation (IRS tax transcript, verification of child support, etc.). The IRS Data Retrieval process provides the easiest way to meet these requirements.
- Within two weeks upon acceptance to Lewis and completion of the FAFSA, notification of financial aid eligibility will be mailed to your address on file. Simply follow the steps outlined in the packet.
- If you're awarded financial aid, you must complete the Entrance Counseling and Direct Stafford Loan Promissory Note (MPN) upon receiving your Financial Aid Award Letter.

If you have any questions about the types of financial aid you may qualify for, contact our Financial Aid office at (815) 836-5135 or finaid@lewisu.edu.

Questions?

Call **(815) 836-5610** or
e-mail [**grad@lewisu.edu**](mailto:grad@lewisu.edu)



Dr. Ray Klump, Chair and Professor
Computer and Mathematical Sciences

“Data Science holds the key to addressing so many of today’s most pressing problems. Our ability to collect data has never been greater. Our ability to recall, interpret, visualize, use and secure that data, however, has not kept pace. We need to prepare people who can create ways to distill meaning from the vast quantities of data we are collecting. Those individuals will enable us to solve the particularly challenging problems we now face, including those in healthcare, business, the government and social policy.”

Lewis University

Mission Statement: Guided by its Catholic and Lasallian heritage, Lewis University provides to a diverse student population programs for a liberal and professional education grounded in the interaction of knowledge and fidelity in the search for truth. Lewis promotes the development of the complete person through the pursuit of wisdom and justice. Fundamental to its Mission is a spirit of association which fosters community in all teaching, learning, and service.

A Welcoming Campus

The Lewis main campus in Romeoville, Illinois, is a picturesque 410-acre setting which houses 1,300 students in 12 residence halls, all within walking distance of well-equipped classrooms, the library, the JFK Recreation and Fitness Center, the Student Union, and the Sancta Alberta Chapel. Lewis suburban campuses are located in Oak Brook, Tinley Park, and Hickory Hills. Additionally, classes are offered at numerous sites throughout the Chicagoland area and in Albuquerque, N.M. Illinois campuses are easily accessible to corporate offices in Chicago and the suburbs, making it easy for students to complete professional internships.

Enrollment

Lewis currently has nearly 7,000 undergraduate and graduate students. Many are from the Chicago region, with international students representing nearly 30 different countries.



Outstanding Academic Choices

Located in the Midwest, Lewis University is a comprehensive, Catholic university, where the traditions of liberal learning, values and preparation for professional work come together with a synergy that gives the university its educational identity and focus. Founded in 1932, Lewis is a dynamic, coeducational university offering nearly 85 undergraduate majors and programs of study, 35 graduate programs, and certificates of advanced study. Lewis is one of many schools sponsored by the De La Salle Christian Brothers, an international Roman Catholic teaching order.

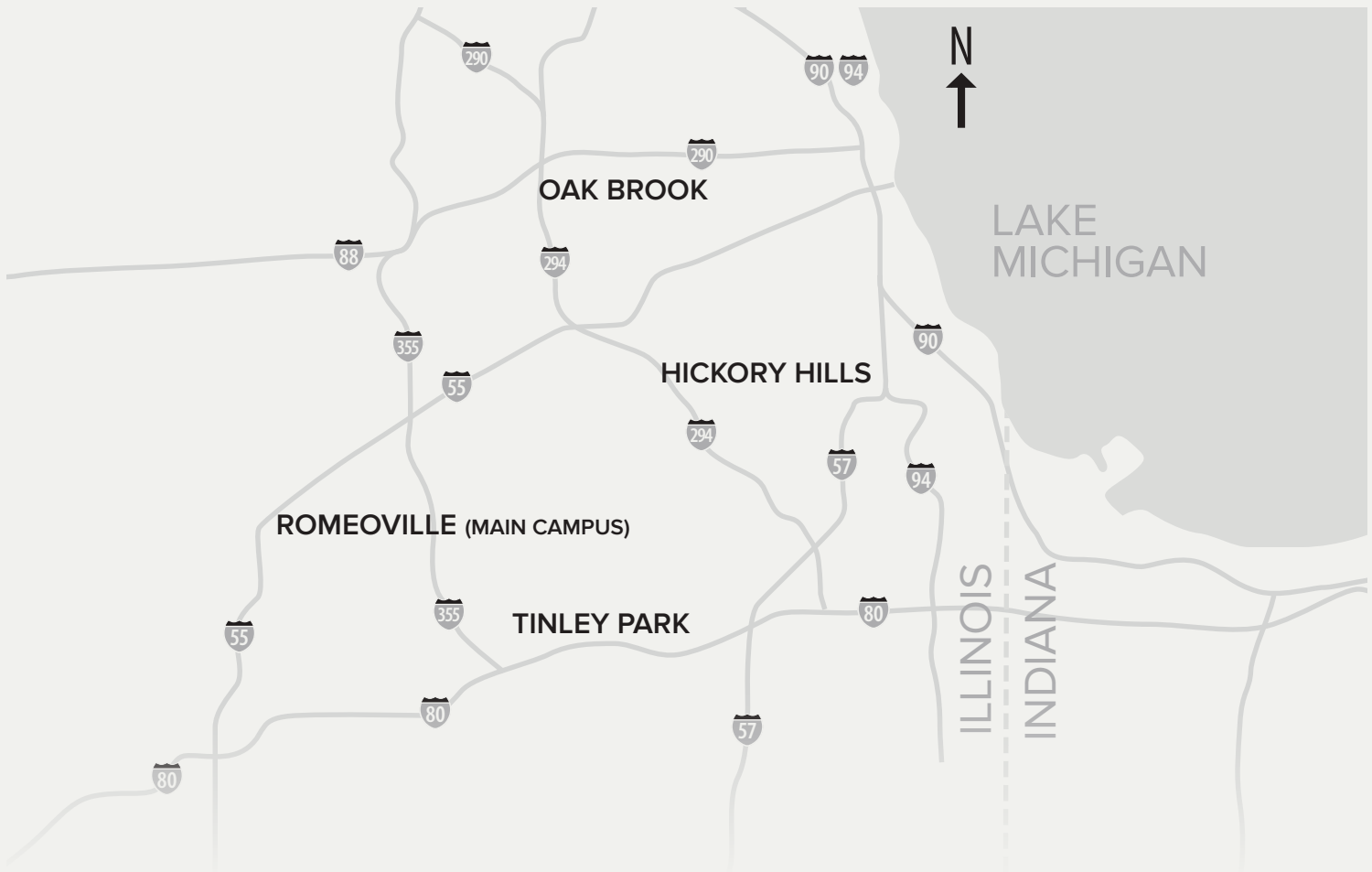
Experienced Faculty

Lewis has more than 200 full-time faculty members who take their students' personal and professional success to heart. The majority hold terminal degrees in their fields. Many are experienced practitioners. The student/faculty ratio is 13:1.

Accreditation

Lewis University is accredited by, and a member of, the Higher Learning Commission.

Information contained herein is subject to change without notice. Lewis University reserves the right to revise, supplement, or rescind its contents at any time.



Convenient Campus Locations Close to Home and Work

Main Campus

One University Parkway
 Romeoville, IL 60446
 (815) 838-0500

Hickory Hills Campus

9634 S. Roberts Road
 Hickory Hills, IL 60457
 (708) 233-9768

Tinley Park Campus

18501 Maple Creek Drive
 Tinley Park, IL 60477
 (708) 444-3180

Oak Brook Campus

1111 W. 22nd Street
 Suite 700
 Oak Brook, IL 60523
 (630) 573-1740

**Lewis University
 at Albuquerque**

2440 Louisiana Blvd. NE
 Albuquerque, NM
 87110-4383
 (505) 25-LEWIS

For More Information

grad@lewisu.edu

(815) 836-5610

Fax (815) 836-5578

Note: Not all programs are offered at all campuses. See your counselor or academic advisor for details.



Office of Graduate Admission
 One University Parkway
 Romeoville, IL 60446-2200
 (815) 836-5610