

# INTELLIGENT SYSTEMS ENGINEERING (BS)

The BS in Intelligent Systems Engineering program prepares students for engineering systems that integrate physical processes, computation, and control. Intelligent systems are used to manage electric grids and other infrastructures, home utilities and appliances, robots, self-driving vehicles, smart appliances, and Internet of Things (IoT).

Program Requirements	Quarter Hours
Liberal Studies Requirements	48
Major Requirements	140
Open Electives	4
<b>Total hours required</b>	<b>192</b>

## Learning Outcomes

Students will be able to:

- Model a computational problem, select appropriate algorithms and data structures for a solution, justify the correctness of the algorithm, and implement an application solving the problem.
- Analyze and select an algorithm based on system effects.
- Analyze a simple physical process; develop a mathematical model that describes it and feedback control system that controls it.
- Select the hardware (e.g., sensor, actuators, controllers, etc.) and integrate feedback control algorithms to implement a cyber-physical system.

## Liberal Studies Requirements

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

First Year Program	Hours
<b>Chicago Quarter</b>	
LSP 110 DISCOVER CHICAGO or LSP 111 or EXPLORE CHICAGO	4
<b>Focal Point</b>	
Not Required	
<b>Writing</b>	
WRD 103 COMPOSITION AND RHETORIC I <sup>1</sup>	4
WRD 104 COMPOSITION AND RHETORIC II <sup>1</sup>	4
<b>Quantitative Reasoning</b>	
Not Required	
<b>Sophomore Year</b>	
<b>Race, Power, and Resistance</b>	
LSP 200 SEMINAR ON RACE, POWER, AND RESISTANCE	4
<b>Junior Year</b>	
<b>Experiential Learning</b>	
Required in major <sup>1</sup>	
<b>Senior Year</b>	
<b>Capstone</b>	
Required in major <sup>1</sup>	

<sup>1</sup> Students must earn a C- or better in this course.

## Learning Domains

**Arts and Literature (AL)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/>)

- 2 Courses Required

**Historical Inquiry (HI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/>)

- 2 Courses Required

**Math and Computing (MC)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/math-and-computing/>)

- Not Required

**Philosophical Inquiry (PI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/>)

- 1 Course Required

**Religious Dimensions (RD)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/>)

- 1 Course Required

**Scientific Inquiry (SI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/>)

- Not Required

**Social, Cultural, and Behavioral Inquiry (SCBI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/social-cultural-and-behavioral-inquiry/>)

- 2 Courses Required

## Note

Specified required courses within Liberal Studies may have grade minimums (e.g. C- or better). Please consult your advisor or your college and major requirements.

Courses offered in the student's primary major cannot be taken to fulfill LSP Domain requirements. If students double major, LSP Domain courses may double count for both LSP credit and the second major. Students who choose to take an experiential learning course offered by the major may count it either as a general elective or the Experiential Learning requirement.

In meeting learning domain requirements, no more than one course that is outside the student's major and is cross-listed with a course within the student's major, can be applied to count for LSP domain credit. This policy does not apply to those who are pursuing a double major or earning BFA or BM degrees.

## Major Requirements

### Course Requirements

Course	Title	Quarter Hours
<b>First Year</b>		
CSC 243	PYTHON FOR PROGRAMMERS (+1 Major Elective)	8
or CSC 241 & CSC 242	INTRODUCTION TO COMPUTER SCIENCE I and INTRODUCTION TO COMPUTER SCIENCE II	
CSE 299	HARDWARE PROJECTS	4
MAT 140	DISCRETE MATHEMATICS I	4
MAT 141	DISCRETE MATHEMATICS II	4
MAT 150	CALCULUS I	4
MAT 151	CALCULUS II	4
MAT 152	CALCULUS III	4
<b>Second Year</b>		
CSC 300	DATA STRUCTURES I	4
CSC 301	DATA STRUCTURES II	4
CSC 373	COMPUTER SYSTEMS I	4
CSC 380	FOUNDATIONS OF ARTIFICIAL INTELLIGENCE	4
CSE 332	ANALOG AND DIGITAL CIRCUITS	4
CSE 333	DIGITAL SIGNAL PROCESSING	4
PHY 170	UNIVERSITY PHYSICS I	4
PHY 171	UNIVERSITY PHYSICS II	4
PHY 172	UNIVERSITY PHYSICS III	4
<b>Third Year</b>		
CSC 374	COMPUTER SYSTEMS II	4
CSE 314	NETWORKING FOR CYBER-PHYSICAL SYSTEMS	4
CSE 316	CYBER-PHYSICAL SYSTEM SECURITY	4
CSE 351	EMBEDDED SYSTEMS I	4
CSE 352	EMBEDDED SYSTEMS II	4
MAT 260	MULTIVARIABLE CALCULUS I	4
MAT 262	LINEAR ALGEBRA	4
MAT 304	DIFFERENTIAL EQUATIONS	4
WRD 204	TECHNICAL WRITING	4
<b>Fourth Year</b>		
MAT 351	PROBABILITY AND STATISTICS I	4
CSC 321	DESIGN AND ANALYSIS OF ALGORITHMS	4
CSE 361	MATHEMATICAL FOUNDATIONS OF AUTONOMOUS SYSTEMS	4
CSE 362	FOUNDATIONS OF CYBER-PHYSICAL COMPUTING	4

CSE 393	CYBER-PHYSICAL SYSTEMS ENGINEERING PRACTICUM I	4
CSE 394	CYBER-PHYSICAL SYSTEMS ENGINEERING PRACTICUM II	4
12 credit hours of Major Electives		12

### Major Electives

Major electives may be selected from the following list of courses:

Course	Title	Quarter Hours
BIO 191	GENERAL BIOLOGY I FOR SCIENCE MAJORS	
BIO 192	GENERAL BIOLOGY II FOR SCIENCE MAJORS	
BIO 193	GENERAL BIOLOGY III FOR SCIENCE MAJORS	
CHE 140	UNIVERSITY CHEMISTRY I	
CHE 142	UNIVERSITY CHEMISTRY II	
CHE 144	UNIVERSITY CHEMISTRY III	
CSC 299	SOPHOMORE LAB IN APPLIED COMPUTING	
CSE 304	RAPID PROTOTYPING TECHNOLOGIES	
CSE 341	DIGITAL SYSTEMS	
CSE 342	COMPUTER SYSTEM ORGANIZATION AND DESIGN	
CSE 375	INTRODUCTION TO ROBOTICS	
CSE 377	INTRO TO MECHATRONICS	
CSEC 378	HOST BASED SECURITY (FORMERLY CNS 378)	
IT 300	RESEARCH EXPERIENCE	
MAT 352	PROBABILITY AND STATISTICS II	
MAT 353	PROBABILITY AND STATISTICS III	
MAT 370	ADVANCED LINEAR ALGEBRA	
MAT 381	FOURIER ANALYSIS AND SPECIAL FUNCTIONS	
MAT 384	MATHEMATICAL MODELING	
MAT 385	NUMERICAL ANALYSIS I	
MAT 386	NUMERICAL ANALYSIS II	
PHY 110	BASIC ELECTRONICS: PRINCIPLES & TECHNIQUES	
PHY 231	LINEAR ELECTRIC CIRCUITS	
PHY 270	UNIVERSITY PHYSICS IV	
PHY 300	METHODS OF COMPUTATIONAL AND THEORETICAL PHYSICS I	
PHY 301	METHODS OF COMPUTATIONAL AND THEORETICAL PHYSICS II	
PHY 320	ELECTRICITY AND MAGNETISM I	
PHY 321	ELECTRICITY AND MAGNETISM II	
PHY 370	ELECTRONICS	
Any 300-level CSC course		
Any 300-level SE course		

## Open Electives

Open elective credit also is required to meet the minimum graduation requirement of 192 hours.

See [www.cdm.depaul.edu](http://www.cdm.depaul.edu) (<http://www.cdm.depaul.edu/>) to see *sample schedule of course requirements on a year-by-year basis*.

## Degree Requirements

Students in this degree must meet the following requirements:

- Complete a minimum of 192 credit hours (generally 48 courses).
- Earn a grade of C- or higher in WRD 103, WRD 104, and all Major and Minor courses.
- Earn a grade of D or higher in all other Liberal Studies and Open Elective courses.
- Maintain a cumulative GPA of 2.0 or higher.

## Program Combination Restrictions

Students pursuing the BS in Intelligent Systems Engineering are forbidden from pursuing the Minor in Computer Science.