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2023-2024 U...

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## Computer ☐ ☐ ☐ Science: Machine Intelligence, BS

← Return to: [College of Science](#)

## About the Program

Purdue Computer Science is one of the country's top-ranked programs. Faculty members are shaping the future of information technology through cutting-edge research. Students can take courses that include such topics as graphics and animation, web programming, competitive programming, cryptography and security, networks, software engineering, distributed systems, information systems, artificial intelligence, and bioinformatics.

The flexible curriculum offers students the opportunity to be involved in a dynamic discipline that will continue to grow and to contribute significantly to progress in many other disciplines and ultimately to changes in human society that are nothing short of profound. Students learn communication skills, teamwork, and problem-solving skills and acquire the necessary technical skills for positions in computing throughout society.

[Computer Science Website](#)

[Computer Science Major  
Change \(CODO\) Requirements](#)

Computer Science students begin by taking six core courses that teach them the

fundamentals of computer science. Students then take coursework in a concentration, which allows them to deepen their understanding in a specific area. Machine Intelligence is designed to prepare students to work in fields related to management and analysis of data, including areas such as machine learning, information retrieval, and data mining. The track is designed to prepare students to understand, and effectively apply in practice, the principles and techniques of data and knowledge representation, search, as well as learning and reasoning with data.

## About the Program

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## Degree Requirements

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120 Credits  
Required

## Curriculum and Degree Requirements for College of Science

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A College of Science degree is conferred when a student successfully completes all requirements in their degree program. Students will complete coursework or approved experiential learning activities to meet the following three degree components:

1. Major
2. Science Core Curriculum
3. Electives

Students may use any of the following options to meet College of Science degree requirements:

- Purdue Coursework
- AP, IB, and CLEP credit.  
The use of AP and IB coursework varies between College of Science degree plans.
- [Transfer Credit](#). Students should consult the Admissions Transfer Credit Resource page for all available transfer options.

College of Science degree programs vary widely in their approval and use of the proceeding options and thus students are strongly encouraged to work closely with their academic advisors and to regularly consult their MyPurduePlan to view the use of each option in their degree plan.

Most College of Science degree programs contain elective credits students may use to pursue courses that relate to their interests or which support their major area of study. The elective area of a degree plan may also be used to complete [minors](#), second majors and certificates such as the Entrepreneurial Certificate. With the exception of courses on the No Count List, any Purdue course may be used to meet the elective area of a student's degree plan.

### **College of Science Core Requirements**

All Students starting Purdue University Fall semester, 2007 or later are required to pursue the 2007 Science Core curriculum.

The College of Science Core Curriculum requires the completion of approved coursework and/or experiential learning opportunities in the following academic areas:

- [Composition and Presentation](#)
- [Computing](#)
- [Cultural Diversity](#)

[\(Language and Culture\)](#)

- [General Education](#)
- [Great Issues in Science](#)
- [Laboratory Science](#)
- [Mathematics](#)
- [Science Technology and Society](#)
- [Statistics](#)
- [Teambuilding and Collaboration](#)
- [No Count List](#)

### **Earning Core Curricular Requirements through Experience**

Students may meet selected core curriculum requirements through approved experiential learning opportunities. Interested students should contact their academic advisor for more information on this option and incorporating experiential learning into their four-year program of study. For more information on earning requirements through experience, please [click here](#).

## **Computer Science Major Courses (46-50 credits)**

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### **Required CS Major Math Courses (7-8 credits)**

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Must have C or better to meet prerequisite for certain upper level CS courses

- [MA 26100 - Multivariate Calculus](#)  
or
- [MA 27101 - Honors Multivariate Calculus](#)
  
- [MA 26500 - Linear Algebra](#) or
- [MA 35100 - Elementary Linear Algebra](#)

### **Required CS**

## Major Core Courses (21 credits)

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Must have C or better in all courses.

- [CS 18000 - Problem Solving And Object-Oriented Programming](#) ♦  
(satisfies Computing and Teambuilding requirements for College of Science core)
- [CS 18200 - Foundations Of Computer Science](#) ♦
- [CS 24000 - Programming In C](#) ♦
- [CS 25000 - Computer Architecture](#)
- [CS 25100 - Data Structures And Algorithms](#)
- [CS 25200 - Systems Programming](#)

## Machine Intelligence Concentration (18 credits)

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### Required Courses

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- [CS 37300 - Data Mining And Machine Learning](#)
- [CS 38100 - Introduction To The Analysis Of Algorithms](#)
- [CS 47100 - Introduction to Artificial Intelligence](#) or
- [CS 47300 - Web Information Search And Management](#)
- [MA 41600 - Probability](#) or
- [STAT 41600 - Probability](#) or
- [STAT 51200 -](#)

## Selectives

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Choose 2 courses.

- [CS 31400 - Numerical Methods](#)
- [CS 34800 - Information Systems](#)
- [CS 35200 - Compilers: Principles And Practice](#)
- [CS 43900 - Introduction To Data Visualization](#)
- [CS 44000 - Large Scale Data Analytics](#)
- [CS 44800 - Introduction To Relational Database Systems](#)
- [CS 45600 - Programming Languages](#)
- [CS 47100 - Introduction to Artificial Intelligence](#)
- [CS 47300 - Web Information Search And Management](#)
- [CS 47500 - Human-Computer Interaction](#)
- [CS 48300 - Introduction To The Theory Of Computation](#)
- [CS 57700 - Natural Language Processing](#)
- [CS 57800 - Statistical Machine Learning](#)

Other  
Departmental/P  
rogram Course  
Requirements  
(32-54 credits)

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# SCIENCE CORE REQUIREMENTS

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^ - Labeled as a Science Core Selection in the four year plan of study

\* - Requirement may be met with a zero credit experiential learning option. See your advisor for more information.

## Composition & Presentation

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### First-Year Composition (3-4 credits)

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Choose one course from this [list](#). (satisfies Written Communication and Information Literacy for core)

### Technical Writing And Presentation\* (0-6 credits)

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Choose one or two from this [list](#); [COM 21700](#) is strongly recommended to satisfy Oral Communication for core.

## Computing

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*Met with required major coursework.*

## Cultural Diversity (Language & Culture)^\* (0-9 credits)

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Choose courses from this [list](#) to fulfill each Option below (select courses COULD satisfy Humanities for core).

- Language & Culture Option I
- Language & Culture Option II
- Language & Culture Option III



## General Education^ (9 credits)

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Choose courses from this [list](#) to fulfill each Option below (select courses COULD satisfy Behavioral/Social Science for core).

- General Education Option I
- General Education Option II
- General Education Option III

## Great Issues In Science (3 credits)

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Choose one from this [list](#).

## Laboratory Science (6-8 credits)

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Choose courses from this [list](#) to fulfill each Option below (satisfies Science for core).

- Laboratory Science Option I
- Laboratory Science Option II

## Mathematics (8-10 credits)

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*(satisfies Quantitative Reasoning for core)*

- [MA 16100 - Plane Analytic Geometry And Calculus I](#)  
(must have C or better to meet prerequisite for [CS 18200](#)) or
- [MA 16500 - Analytic Geometry And Calculus I](#)  
(must have C or better to meet prerequisite for [CS 18200](#))
- [MA 16200 - Plane Analytic Geometry](#)

And Calculus II or

- MA 16600 -  
Analytic Geometry  
And Calculus II

## Multidisciplinary Experience<sup>^</sup>\* (0- 3 credits)

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Choose one from  
this [list](#) (select courses  
COULD satisfy  
Science, Technology,  
Society for core).

## Statistics (3 credits)

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- STAT 35000 -  
Introduction To  
Statistics ♦ or
- STAT 51100 -  
Statistical Methods  
♦

## Team-Building and Collaboration

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*Met with required major  
coursework.*

## Electives (16-42 credits)

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CS 19300 - Tools is a  
required freshman seminar  
course; corequisites with CS  
18000. This is not a degree  
requirement. CS 29100 -  
Sophomore Development  
Seminar and CS 39100 -  
Junior Resources Seminar are  
optional but recommended.

## Grade Requirements

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- All track requirements,  
regardless of  
department, must be  
completed with a grade  
of C or higher.
- Minimum grade  
requirements for  
prerequisites is C unless  
alternative minimum  
grade requirement is  
listed.

- \*\*\*All CS core courses and all track requirements, regardless of department, must be completed with a grade of “C” or higher.
- All prerequisites to CS core courses and track requirements, regardless of department, must be completed with a grade of C or higher.

## GPA Requirements

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- 2.0 Major and Graduation GPA required for Bachelor of Science degree.

## Course Requirements & Notes

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- Non-CS courses and graduate level courses may have additional prerequisites that must be met in order to be eligible to take the course.
- No course can be counted both for a required and selective course within the same track.
- Enrollment in freshman seminar courses [CS 19100](#) and [CS 19300](#) is required with [CS 18000](#). They are not degree requirements. [CS 29100 - Sophomore Development Seminar](#) and [CS 39100 - Junior Resources Seminar](#) are optional but recommended.

## College of Science Pass/No Pass Option Policy

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- Only free electives and courses at the 50000-level general education

requirement may be taken under the pass/not-pass option.

- The pass/not-pass grade mode may be entered for courses which are not required by a student's major(s), minor(s) or science core curriculum.
- Grade mode Passing is equivalent to at a minimum grade of C- had a letter grade been awarded.
- Students may elect to use the pass/not-pass option for no more than 20% of the 124/120 credit requirement for graduation and for no more than two courses per academic year (Fall-Summer).
- The pass/not-pass option cannot be elected for a course that has already been completed with a letter grade. University Regulation.
- Students may take elective credit while abroad using the P/NP mode. In the case of universities which only post P/NP, the University will apply a calculation process to determine a letter grade.
- Department of Languages and Cultures P/NP policy and Language Placement results. Students must take advanced coursework for a letter grade to receive credit for lower-level language courses.

## College of Science Transfer Credit Policy

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College of Science degree programs vary widely in their approval and use of non-Purdue originated credit (AP, IB, CLEP, and transfer credit). Students work closely with

their academic advisors and degree plan audits to review the use and approval of each non-Purdue credit option.

## University Requirements

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### University Core Requirements

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For a complete listing of University Core Course Selectives, visit the [Provost's Website](#).

- Human Cultures: Behavioral/Social Science (BSS)
- Human Cultures: Humanities (HUM)
- Information Literacy (IL)
- Oral Communication (OC)
- Quantitative Reasoning (QR)
- Science #1 (SCI)
- Science #2 (SCI)
- Science, Technology, and Society (STS)
- Written Communication (WC)

### Civics Literacy Proficiency Requirement

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The Civics Literacy Proficiency activities are designed to develop civic knowledge of Purdue students in an effort to graduate a more informed citizenry. For more information visit the Civics Literacy Proficiency [website](#).

Students will complete the Proficiency by passing a test of civic knowledge, and completing one of three paths:

- Attending six approved civics-related events and completing an assessment for each; or

- Completing 12 podcasts created by the Purdue Center for C-SPAN Scholarship and Engagement that use C-SPAN material and completing an assessment for each; or
- Earning a passing grade for one of [these approved courses](#) (or transferring in approved AP or departmental credit in lieu of taking a course).

## Upper Level Requirement

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- Resident study at Purdue University for at least two semesters and the enrollment in and completion of at least 32 semester hours of coursework required and approved for the completion of the degree. These courses are expected to be at least junior-level (30000+) courses.
- Students should be able to fulfill *most, if not all*, of these credits within their major requirements; there should be a clear pathway for students to complete any credits not completed within their major.

## Sample 4-Year Plan

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### Fall 1st Year

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- [CS 18000 - Problem Solving And Object-Oriented Programming](#) ♦ \*\*\*
- [MA 16100 - Plane Analytic Geometry](#)

[And Calculus I or](#)

- [MA 16500 - Analytic Geometry And Calculus I](#)
- Science Core  
Selection - Credit  
Hours: 3.00-4.00  
(English Composition suggested.)
- Elective - Credit  
Hours: 3.00
- Elective - Credit  
Hours: 1.00 (CS  
19300 suggested.)

## 15-17 Credits

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### Spring 1st Year

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- [CS 18200 - Foundations Of Computer Science](#) ♦  
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- [CS 24000 - Programming In C](#) ♦  
\*\*\*
- [MA 16200 - Plane Analytic Geometry And Calculus II or](#)
- [MA 16600 - Analytic Geometry And Calculus II](#)
- Science Core First-Year Composition  
Selection - Credit  
Hours: 3.00-4.00
- Electives - Credit  
Hours: 1.00 - 3.00

## 14-18 Credits

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### Fall 2nd Year

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- [CS 25000 - Computer Architecture](#) \*\*\*
- [CS 25100 - Data Structures And Algorithms](#) \*\*\*
- [MA 26100 - Multivariate Calculus](#)  
or
- [MA 27101 - Honors Multivariate Calculus](#)
- Science Core

Selection - Credit  
Hours: 3.00 - 4.00

- Elective - Credit  
Hours: 1.00 ([CS 29100](#) recommended)

## 15-17 Credits

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### Spring 2nd Year

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- [CS 25200 - Systems Programming](#) \*\*\*
- [MA 26500 - Linear Algebra](#) or
- [MA 35100 - Elementary Linear Algebra](#)
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00  
(COM 21700 suggested.)
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Elective - Credit  
Hours: 3.00

## 16-17 Credits

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### Fall 3rd Year

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- [STAT 35000 - Introduction To Statistics](#) ♦ or
- [STAT 51100 - Statistical Methods](#) ♦
- Machine Intelligence  
Concentration course-  
Credit Hours: 3.00 \*\*\*
- Machine Intelligence  
Concentration course  
- Credit Hours: 3.00  
\*\*\*
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Elective - Credit  
Hours: 1.00 ([CS 39100](#) recommended)
- Elective - Credit  
Hours: 3.00

## 16-17 Credits

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## Spring 3rd Year

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- Machine Intelligence  
Concentration course  
- Credit Hours: 3.00  
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- Machine Intelligence  
Concentration course  
- Credit Hours: 3.00  
\*\*\*
- Great Issues In  
Science Selection -  
Credit Hours: 3.00
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Elective - Credit  
Hours: 3.00

### 15-17 Credits

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## Fall 4th Year

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- Machine Intelligence  
Concentration course  
- Credit Hours: 3.00  
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- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Elective - Credit  
Hours: 3.00
- Elective - Credit  
Hours: 3.00
- Elective - Credit  
Hours: 1.00

### 16-18 Credits

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## Spring 4th Year

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- Machine Intelligence  
Concentration course  
- Credit Hours: 3.00  
\*\*\*
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Science Core  
Selection - Credit  
Hours: 3.00 - 4.00
- Elective - Credit  
Hours: 3.00
- Elective - Credit  
Hours: 3.00

## World Language Courses

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World Language proficiency requirements vary by program. The following list is inclusive of all world languages PWL offers for credit; for acceptable languages and proficiency levels, see your advisor. (ASL-American Sign Language; ARAB-Arabic; CHNS-Chinese; FR-French; GER-German; GREK-Greek(Ancient); HEBR-Hebrew(Biblical); HEBR-Hebrew(Modern); ITAL-Italian; JPNS-Japanese; KOR-Korean; LATN-Latin; PTGS=Portuguese; RUSS-Russian; SPAN-Spanish)

## Critical Course

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The ♦ course is considered critical.

In alignment with the Degree Map Guidance for Indiana's Public Colleges and Universities, published by the Commission for Higher Education (pursuant to HEA 1348-2013), a Critical Course is identified as "one that a student must be able to pass to persist and succeed in a particular major. Students who want to be nurses, for example, should know that they are expected to be proficient in courses like biology in order to be successful."

These would be identified by the institutions for each degree program”.

## Disclaimer

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The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

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