COMPUTER SCIENCE (BS)

The B.S. in Computer Science (BSCS) is built on a broad and rigorous foundation of science, mathematics, software engineering, and advanced computer science topics. All students participate in a large software engineering project during their senior years. Each project is completed under the guidance of a faculty advisor and a project sponsor. Advisors are frequently practicing software developers. Project sponsors are often from the computer industry. BS students can also pursue optional concentrations in Data Science, Software Application Development, or Software Security.

The Bachelor of Science in Computer Science degree program is accredited by the Computing Accreditation Commission of ABET, www.abet.org (https://www.abet.org/), under the General Program Criteria and the Computer Science and Similarly Named Computing Programs Program Criteria.

Program Requirements

120 credits (89 credits in computer science, mathematics, and science)

Code	Title	Hours
Computer Science Requirements		
Lower Division		
CPSC 121	Computer Science I	3
CPSC 122	Computer Science II	3
CPSC 223	Algorithm and Abstract Data Structures	3
CPSC 224	Software Development	3
CPSC 260	Computer Organization	3
Upper Division		
CPSC 321	Database Management Systems	3
CPSC 326	Organization of Program Languages	3
CPSC 328	Computer Networks	3
CPSC 346	Operating Systems	3
CPSC 391	Software Engineering and Ethics	3
CPSC 450	Design and Analysis of Computer Algorithms	3
CPSC 491	Software Engineering	2
CPSC 492	Senior Design Project II	3
Computer Science Technical Electives		
Any 200, 300, or 400 level CPSC course excluding CPSC 497. At most 2 courses from CPSC 2xx, and 435.		21
Mathematics Requirements		
MATH 157	Calculus and Analytic Geometry I	4
MATH 231	Discrete Structures	3
MATH 258	Calculus and Analytic Geometry II	4
Select two of the following:		6
MATH 259	Calculus and Analytic Geometry III	
MATH 260	Ordinary Differential Equation	
MATH 328	Operations Research	
ENSC 371	Advanced Engineering Math	
CPSC 455	Chaos and Dynamical Systems	
any 400 level Mathematics course		
Science Requirements [2]		**4**
BIOL 105 & 105L	Information Flow in Biological Systems and Information Flow in Biological Systems Lab	
BIOL 106	Energy Flow in Biological Systems	
BIOL 205 & 205L	Physiology and Biodiversity and Physiology and Biodiversity Lab	
BIOL 206 & 206L	Ecology and Ecology Lab	
BIOL 207 & 207L	Genetics and Genetics Lab	
CHEM 101 & 101L	General Chemistry I and General Chemistry I Lab	
CHEM 205	Inorganic Chemistry	
CHEM 230 & 230L	Organic Chemistry I and Organic Chemistry Lab I	
CHEM 231 & 231L	Organic Chemistry II and Organic Chemistry Lab II	
CHEM 245 & 245L	Biochemistry and Biochemistry Lab	
CHEM 310 & 310L	Analytical Chemistry and Analytical Chemistry Lab	
PHYS 222	Electronics	
PHYS 224	Modern Physics	
PHYS 325	Computational Physics	
Science and Mathematics Electives		**9**
BIOL 105 & 105L	Information Flow in Biological Systems and Information Flow in Biological Systems Lab	
BIOL 106	Energy Flow in Biological Systems	
BIOL 205 & 205L	Physiology and Biodiversity and Physiology and Biodiversity Lab	
BIOL 206 & 206L	Ecology and Ecology Lab	
BIOL 207 & 207L	Genetics and Genetics Lab	
CHEM 101 & 101L	General Chemistry I and General Chemistry I Lab	
CHEM 205	Inorganic Chemistry	
CHEM 230 & 230L	Organic Chemistry I and Organic Chemistry Lab I	
CHEM 231 & 231L	Organic Chemistry II and Organic Chemistry Lab II	
CHEM 245 & 245L	Biochemistry and Biochemistry Lab	
CHEM 310 & 310L	Analytical Chemistry and Analytical Chemistry Lab	
CPSC 455	Chaos and Dynamical Systems	
ENSC 371	Advanced Engineering Math	
PHYS 121 & 121L	Physics I and Physics I Lab	
PHYS 122 & 122L	Physics II and Physics II Lab	
PHYS 224	Modern Physics	
PHYS 325	Computational Physics	
PHYS 222	Electronics	
MATH 259	Calculus and Analytic Geometry III	
MATH 260	Ordinary Differential Equation	

Any 300 or 400 Mathematics course	
Total Hours	**89**

1 Excluding CPSC 497 Computer Science Internship. At most 2 courses from CPSC 2xx, CPSC 435 Parallel and Cloud Computing, and CPSC 436 Biomedical Informatics and Computing.

2 At least six of the elective science and mathematics credits must be chosen from BIOL, CHEM, or PHYS courses.

CS: Concentration in Software Security

Code	Title	Hours
CPSC 353	Applied Cryptography	3
Select one of the following:		3
CPSC 341	Internet of Things	
EENG 410	Information Theory and Coding	
Total Hours		**6**

CS: Concentration in Data Science

Code	Title	Hours
CPSC 222	Introduction to Data Science	3
CPSC 322	Data Science Algorithms	3
Select one of the following:		3
MATH 121	Introductory Statistics	
MATH 221	Applied Statistics	
MATH 321	Statistics for Experimentalist	
Select two of the following:		6
CPSC 323	Machine Learning and Intelligent Systems	
CPSC 325	Data Science Project Lab	
CPSC 475	Speech and Natural Language Processing	
Total Hours		**15**

Software Application Development Concentration

Code	Title	Hours
CPSC 331	UI/UX Design	3
CPSC 332	Web Development	3
CPSC 333	Mobile App Development	3
CPSC 334	Linux and DevOps	3
Total Hours		**12**

University Core

In addition to their major and minor areas of study, all undergraduate students follow a common program designed to complete their education in those areas that the University considers essential for a Catholic, Jesuit, liberal, and humanistic education. The University Core Curriculum consists of forty-five credits of course work, with additional designation requirements that can be met through core, major, or elective courses.

The University Core Curriculum is a four-year program, organized around one overarching question, which is progressively addressed through yearly themes and questions. Hence, core courses are best taken within the year for which they are designated. First year core courses encourage intellectual engagement and provide a broad foundation of fundamental skills. Second and third year courses examine central issues and questions in philosophy and religious studies. The fourth year course, the Core Integration Seminar, offers a culminating core experience. Taken at any time throughout the four years, broadening courses intersect with the core themes and extend students' appreciation for the humanities, arts, and social and behavioral sciences. Finally, the designation requirements (writing enriched, global studies, and social justice) reflect important values and reinforce students' knowledge and competencies.

Overarching Core Question: As students of a Catholic, Jesuit, and Humanistic University, how do we educate ourselves to become women and men for a more just and humane global community?

Year 1 Theme and Question: Understanding and Creating: How do we pursue knowledge and cultivate understanding?

- The First-Year Seminar (DEPT 193, 3 credits): The First-Year Seminar (FYS), taken in the fall or spring of the first year, is designed to promote an intellectual shift in students as they transition to college academic life. Each small seminar is organized around an engaging topic, which students explore from multiple perspectives. The FYS is offered by many departments across the University (click here [PDF] (https://www.gonzaga.edu/catalogs/current/undergraduate/school-of-engineering-and-applied-science/course-detail/?code=PHIL+101) for list of FYS courses).
- Writing (ENGL 101 Writing, 3 credits) and Reasoning (PHIL 101 Reasoning, 3 credits): The Writing and Reasoning courses are designed to help students develop the foundational skills of critical reading, thinking, analysis, and writing. They may be taken as linked sections. Writing (ENGL 101 Writing) carries one of the three required writing-enriched designations (see below).
- Communication & Speech (COMM 100 Communication and Speech, 3 credits): This course introduces students to interpersonal and small group communication and requires the application of critical thinking, reasoning, and research skills necessary to organize, write, and present several speeches.
- Scientific Inquiry (BIOL 104 Scientific Inquiry:/BIOL 104L Scientific Inquiry Lab, CHEM 104 Scientific Inquiry/CHEM 104L Scientific Inquiry Lab, or PHYS 104 Scientific Inquiry/, 3 credits): This course explores the scientific process in the natural world through evidence-based logic and includes significant laboratory experience. Students pursuing majors that require science courses will satisfy this requirement through their major.
- Mathematics (above Math 100, 3 credits): Mathematics courses promote thinking according to the modes of the discipline—abstractly, symbolically, logically, and computationally. One course in mathematics, above Math 100, excluding MATH 193 FYS: and including any math course required for a major or minor, will fulfill this requirement. MATH 100 College Algebra (College Algebra) and courses without the MATH prefix do not fulfill this requirement.

Year 2 Theme and Question: Being and Becoming: Who are we and what does it mean to be human?

- Philosophy of Human Nature (PHIL 201 Philosophy of Human Nature, 3 credits): This course provides students with a philosophical study of key figures, theories, and intellectual traditions that contribute to understanding the human condition; the meaning and dignity of human life; and the human relationship to ultimate reality.
- Christianity and Catholic Traditions (RELI, 3 credits). Religious Studies core courses approved for this requirement explore diverse topics including Christian scriptures, history, theology, and practices as well as major contributions from the Catholic

intellectual and theological traditions (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).

Year 3 Theme and Question: Caring and Doing: What principles characterize a well lived life?

- Ethics (PHIL 301 Ethics or RELI, 3 credits): The Ethics courses are designed to help students develop their moral imagination by exploring and explaining the reasons humans should care about the needs and interests of others. This requirement is satisfied by an approved ethics course in either Philosophy (PHIL 301 Ethics) or Religious Studies (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).
- World/Comparative Religion (RELI, 3 credits): Religious Studies courses approved for this core requirement draw attention to the diversity that exists within and among traditions and encourage students to bring critical, analytical thinking to bear on the traditions and questions considered. These courses carries one of the required two global-studies designations (see below) (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).

Year 4 Theme and Question: Imagining the Possible: What is our role in the world?"

- Core Integration Seminar (DEPT 432, 3 credits). The Core Integration Seminar (CIS) offers students a culminating core experience in which they integrate the principles of Jesuit education, prior components of the core, and their disciplinary expertise. Some CIS courses may also count toward a student's major or minor. The CIS is offered by several departments across the University (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for list of CIS courses).

The Broadening Courses

- Fine Arts & Design (VART, MUSC, THEA, 3 credits): Arts courses explore multiple ways the human experience can be expressed through creativity, including across different cultures and societies. One approved course in fine arts, music, theatre, or dance will fulfill this requirement (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).
- History (HIST, 3 credits): History courses are intended to develop students' awareness of the historical context of both the individual and the collective human experience. One course in History (HIST 101 Foundations of the West, HIST 102 The West and the World, HIST 112 World History, HIST 103 United States History I, HIST 104 United States History II) will fulfill this requirement.
- Literature (3 credits): Literature courses foster reflection on how literature engages with a range of human experience. One approved course in Literature (offered by English, Classics, or Modern Languages) will fulfill this requirement (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).
- Social & Behavioral Sciences (3 credits): Courses in the social and behavioral sciences engage students in studying human behavior, social systems, and social issues. One approved course offered by Criminal Justice, Economics, Political Science, Psychology, Sociology, or Women and Gender Studies will fulfill this requirement (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).

The Designations

Designations are embedded within already existing core, major, minor, and elective courses. Students are encouraged to meet designation requirements within elective courses as their schedule allows; however, with careful planning students should be able to complete most of the designation requirements within other core, major, or minor courses.

- Writing Enriched (WE; 3 courses meeting this designation): Courses carrying the WE designation are designed to promote the humanistic and Jesuit pedagogical ideal of clear, effective communication. In addition to the required core course, Writing (ENGL 101 Writing), which carries one of the WE designations, students must take two other WE-designated courses (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).
- Global-Studies (GS; 2 courses meeting this designation): Courses carrying the GS designation are designed to challenge students to perceive and understand human diversity by exploring diversity within a context of constantly changing global systems. In addition to the required core course, World/Comparative Religion (RELI 300-level), which carries one of the GS designations, students must take one other GS-designated course (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).
- Social-Justice (SJ; 1 course meeting this designation): Courses carrying the SJ designation are designed to introduce students to one or more social justice concerns. Students must take one course that meets the SJ designation (click here [PDF] (https://gonzaga.azureedge.net/-/media/Website/Documents/Academics/University-Core/university-core-registration-guide.ashx?rev=42dd64be974d42c49aac56d4d16b7963&hash=7264D841F25D646771C8A9E3A04EAD74) for a list of approved courses).

Major-specific adaptations to the University Core Curriculum

All Gonzaga students, regardless of their major, will complete the University Core Curriculum requirements. However some Gonzaga students will satisfy certain core requirements through major-specific programs or courses. Any major-specific adaptations to the core are described with the requirements for the majors to which they apply.

Honors Program Requirements

Students must take the following courses to complete their Honors degree

Code	Title	Hours
HONS 100	Multi-modal Communications	3
PHIL 101	Reasoning	3
HONS 193	FYS:	3
HONS 432	CIS	3
HONS 499	Honors Senior Project	3
Select five of the following: [1]		15-16
HONS 104 & 104L	Science Inquiry and Science Inquiry Lab	
HONS 201	Honors Human Nature	
HONS 217	Honors Special Topics: Mathematics	
HONS 220	Honors Christian Catholic Traditions	
HONS 221	Honor World or Global Religion	
HONS 241	Foundations of the West	
HONS 243	Asian&PacificIslanderAmerHist	
HONS 247	Honors Special Topics in History	
HONS 267	Honors Special Topics in Art	
HONS 287	Honors Special Topics in Literature	
HONS 301	Honors Ethics	
HONS 290	Honors Colloquium [2]	3
HONS 390	Honors Colloquium [2]	3

[1] **These courses are cross-listed with regular University courses, and can fulfill core or major requirements.**

[2] **Course numbers may be repeated for credit.**

In order to remain an Honors student in good standing, a student must:

1. Complete the Honors First Year Block (HONS 193 FYS:, HONS 100 Multi-modal Communications, and PHIL 101H Reasoning: Honors) or the transfer equivalent within one academic year of joining the program.
2. Must either complete 6 credit hours of HONS courses (or courses with the Honors Designation) per academic year, or be within 12 credit hours of completing the Honors requirements. Exceptions will be made for students studying abroad during the academic year.
3. Must achieve a cumulative GPA of 3.3 at the time of graduation and good academic standing throughout their tenure at Gonzaga (as defined by the undergraduate catalogue). Students who drop below a 3.0 for two consecutive semesters will be removed from the program (subject to Director review).

Students who fail to meet these requirements will be removed from the program and will no longer qualify for the Honors scholarship.