# Degree Worksheet for the College of Arts and Sciences: 2022-2023

## B.S. APPLIED MATHEMATICS with Computer Science Concentration

### COLLEGE of ARTS & SCIENCES

Language Requirement

All students who major in the College of Arts & Sciences are required to demonstrate competence in a second language. For complete details: [https://www.gonzaga.edu/college-of-arts-sciences/about/information-for-students/language-requirement-information](https://www.gonzaga.edu/college-of-arts-sciences/about/information-for-students/language-requirement-information)

### B.S. APPLIED MATHEMATICS: 64 CREDITS

#### LOWER DIVISION

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 157</td>
<td>Calculus &amp; Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 258</td>
<td>Calculus &amp; Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 259</td>
<td>Calculus &amp; Analytic Geometry III</td>
<td>4</td>
</tr>
<tr>
<td>CPSC 121</td>
<td>Computer Science I</td>
<td>3</td>
</tr>
<tr>
<td>CPSC 122</td>
<td>Computer Science II</td>
<td>3</td>
</tr>
</tbody>
</table>

#### UNIVERSITY CORE REQUIREMENTS:

**FUNDAMENTAL CORE COURSES**

- **Writing**
  - ENGL 101 Writing (fulfills 3 credits Writing Enriched)*
  - Reasoning
  - PHIL 101 Reasoning
  - First Year Seminar
  - Dept.
  - Communication & Speech
  - COMM 100 Communication & Speech
  - Math
  - MATH (must be above Math 100)
  - Scientific Inquiry (2cr + 1cr lab)
  - BIOL or CHEM or PHYS 104/104L (taken year 1 or 2)

**YEAR 1: Understanding & Creating**

- Christianity & Catholic Traditions
- RELI (see approved list)**

**Philosophy of Human Nature**

- PHIL 201 Philosophy of Human Nature

**YEAR 2: Being & Becoming**

- World/Comparative Religion
- RELI (see approved list)** (fulfills 3cr Global Studies)*

**Year 3: Caring & Doing**

- Ethics
- PHIL 301 Ethics or RELI 330 Principles-Christian Morality

**Year 4: Imagining the Possible**

- Core Integration Seminar
- Dept.

**COMPUTER SCIENCE CONCENTRATION**

- CPSC 322 Data Science Algorithms
- CPSC 351 Theory of Computation
- CPSC 353 Applied Cryptography
- CPSC 450 Design & Analysis-Computer Algorithms

**REQUIRED COURSE DESIGNATIONS**

- Writing Enriched
- Social Justice
- *Global Studies

**Notes:**

- Some courses have pre-requisites, check the catalog carefully!
- For list of approved RELI, Broadening & Designated courses, see: [https://my.gonzaga.edu/academics/undergraduate-programs/general-degree-requirements-procedures/university-core](https://my.gonzaga.edu/academics/undergraduate-programs/general-degree-requirements-procedures/university-core)

### UPPER DIVISION

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 301</td>
<td>Fundamentals of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 350</td>
<td>Numerical Methods</td>
<td>3</td>
</tr>
<tr>
<td>MATH 496</td>
<td>Comprehensive-Applied Math**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Select one of the following two courses:**

- MATH 321 Statistics for Experimentalists
- MATH 422 Mathematical Statistics

If MATH 422 is chosen, then one MATH 400 level elective may be replaced by a MATH 300 level elective.

**Select one of the following two courses:**

- MATH 335 Applied Linear Algebra
- MATH 339 Linear Algebra

**Select one of the following three courses:**

- MATH 413 Real Analysis I
- MATH 437 Abstract Algebra I
- MATH 457 Number Theory and Cryptography

**COMPUTER SCIENCE CONCENTRATION**

- CPSC 122 Computer Science II
- CPSC 222 Introduction to Data Science

**Select one of the following two courses:**

- MATH 351 Combinatorics & Graph Theory

**Select one of the following four courses:**

- CPSC 322 Data Science Algorithms
- CPSC 351 Theory of Computation
- CPSC 353 Applied Cryptography
- CPSC 450 Design & Analysis-Computer Algorithms

**Select three of the following six courses:**

- MATH 328 Operations Research
- MATH 421 Probability Theory
- MATH 423 Stochastic Processes
- MATH 425 Applied Statistical Models
- MATH 426 Experimental Design
- MATH 455 Chaos and Discrete Dynamical Systems

**9 total**

**Social Justice**

**3 total**

**Global Studies**

**6 total**

**NOTE:** some courses have pre-requisites, check the catalog carefully!
CPSC Elective Options:

CPSC 223 Algorithm & Abstract Data Structures
CPSC 224 Software Development
CPSC 321 Database Management Systems
*CPSC 322 Data Science Algorithms
*CPSC 323 Machine Learning & Intelligent Systems
*CPSC 324 Big Data Analytics
CPSC 325 Data Science Project Lab
CPSC 326 Organization of Programming Languages
CPSC 331 UI/UX Design
CPSC 332 Web Development
CPSC 333 Mobile App Development
CPSC 334 Linux and DevOps
*CPSC 351 Theory of Computation
*CPSC 353 Applied Cryptography
CPSC 425 Computer Graphics
CPSC 447 Computer Networks
*CPSC 450 Design & Analysis-Computer Algorithms
CPSC 475 Speech & Natural Language Processing

*(indicates the recommended elective choices)

Check the catalog for pre-requisites when selecting electives.

Select one CPSC 200-300-400 level elective: 3 Credits

<table>
<thead>
<tr>
<th>CPSC</th>
<th>3</th>
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Select one CPSC 300-400 level elective: 3 Credits

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<th>CPSC</th>
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</table>

Select one 300-400 level Math elective: 3 Credits

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<tr>
<th>MATH</th>
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Select two 400-level Math electives: 6 Credits

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<tr>
<th>MATH</th>
<th>3</th>
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*Cannot double-count electives with another requirement.

*Cannot use MATH 335, 339, 432, or 499 as MATH electives.

*A maximum of three (3) total credits from the following may be counted toward Math electives: MATH 365 (may be taken for credit only once), MATH 390, MATH 490, MATH 497.

*For this Computer Science concentration only:

MATH 260 is optional, may be counted as a Math 300-400 level elective.