# Degree Worksheet for the College of Arts and Sciences:  2022-2023
# B.S.  APPLIED MATHEMATICS with Environmental 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*

| | Credits | Sem/Yr |
|---|---|---|
| | | |

## UNIVERSITY CORE REQUIREMENTS:
### ▶ FUNDAMENTAL CORE COURSES
#### *Year 1: Understanding & Creating*

| | Credits | Sem/Yr |
|---|---|---|
| *Writing* | | |
| ENGL 101 Writing  (fulfills 3 credits Writing Enriched)* | 3 | |
| *Reasoning* | | |
| PHIL 101 Reasoning | 3 | |
| *First Year Seminar* | | |
| Dept.  193 | 3 | |
| *Communication & Speech* | | |
| COMM 100 Communication & Speech | 3 | |
| *Math* | | |
| MATH  (must be above Math 100) | 3 | |
| *Scientific Inquiry (2cr + 1cr lab)* | | |
| BIOL or CHEM or PHYS 104/104L  (taken year 1 or 2) | 3 | |

#### *Year 2: Being & Becoming*

| | Credits | Sem/Yr |
|---|---|---|
| *Christianity & Catholic Traditions* | | |
| RELI  (see approved list)** | 3 | |
| *Philosophy of Human Nature* | | |
| PHIL 201 Philosophy of Human Nature | 3 | |

#### *Year 3: Caring & Doing*

| | Credits | Sem/Yr |
|---|---|---|
| *World/Comparative Religion* | | |
| RELI  (see approved list)**  (fulfills 3cr Global Studies)* | 3 | |
| *Ethics* | | |
| PHIL 301 Ethics **or** RELI 330 Principles-Christian Morality | 3 | |

#### *Year 4: Imagining the Possible*

| | Credits | Sem/Yr |
|---|---|---|
| *Core Integration Seminar* | | |
| Dept.  432 | 3 | |

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

### ▶ BROADENING COURSES - *see approved list***

| | Credits | Sem/Yr |
|---|---|---|
| Social & Behavioral Science | | |
| | 3 | |
| Literature | | |
| | 3 | |
| History | | |
| | 3 | |
| Fine Arts & Design | | |
| | 3 | |

### ▶ REQUIRED COURSE DESIGNATIONS - *see approved list***

| | Credits | Sem/Yr |
|---|---|---|
| *Writing Enriched | 9 total | |
| Social Justice | 3 total | |
| *Global Studies | 6 total | |

***for list of approved RELI, Broadening & Designated courses, see* :
*https://my.gonzaga.edu/academics/undergraduate-programs/general-degree-requirements-procedures/university-core*

## B.S. APPLIED MATHEMATICS:  68 CREDITS
## with Environmental Science Concentration

### APPLIED MATHEMATICS   34 Credits

**LOWER DIVISION**   *18 Credits*

| Course | Course Title | Credits | Grade |
|---|---|---|---|
| MATH 157 | Calculus & Analytic Geometry I | 4 | |
| MATH 258 | Calculus & Analytic Geometry II | 4 | |
| MATH 259 | Calculus & Analytic Geometry III | 4 | |
| MATH 260 | Ordinary Differential Equations | 3 | |
| CPSC 121 | Computer Science I | 3 | |

**UPPER DIVISION**   *10 Credits*

| | | Credits | |
|---|---|---|---|
| MATH 301 | Fundamentals of Mathematics | 3 | |
| MATH 350 | Numerical Methods | 3 | |
| MATH 413 | Real Analysis I | 3 | |
| MATH 496 | Comprehensive-Applied Math | 1 | |

*Select one of the following two courses:*   *3 Credits*

| | | Credits | |
|---|---|---|---|
| MATH 335 | Applied Linear Algebra | 3 | |
| MATH 339 | Linear Algebra | 3 | |

*Select one of the following two courses:*   *3 Credits*

| | | Credits | |
|---|---|---|---|
| MATH 321 | Statistics for Experimentalists | 3 | |
| MATH 422 | Mathematical Statistics | 3 | |

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

### ENVIRONMENTAL SCIENCE CONCENTRATION   34 Credits

| | | Credits | |
|---|---|---|---|
| ENVS 101 | Introduction to Environmental Studies | 3 | |
| ENVS 103/103L | Environmental Biology+Lab[1] | 4 | |
| ENVS 320 | Economics of Environmental Protection[3] | 3 | |
| ENVS 384/384L | GIS and Ecological Techniques[4] | 4 | |

*Select one of the following two course options:*   *4 Credits*

| | | Credits | |
|---|---|---|---|
| CHEM 101/101L | General Chemistry+Lab | 4 | |
| BIOL 105/105L | Info Flow-Biological System+Lab | 4 | |

*Select one of the following two course options:*   *4 Credits*

| | | Credits | |
|---|---|---|---|
| ENVS 110/110L | Intro to Earth Systems+Lab | 4 | |
| ENVS 202/202L | Chemistry & the Environment+Lab[2] | 4 | |

*Select two of the following five courses:*   *6 Credits*

| | | Credits | |
|---|---|---|---|
| MATH 425 | Applied Statistical Models | 3 | |
| MATH 426 | Experimental Design | 3 | |
| MATH 440 | Foundations of Applied Math | 3 | |
| MATH 454 | Partial Differential Equations | 3 | |
| MATH 462 | Nonlinear Systems and Chaos | 3 | |

*Select one 300-400 level Math elective:*   *3 Credits*

| | | Credits | |
|---|---|---|---|
| MATH | | 3 | |

*Select one 400-level Math elective:*   *3 Credits*

| | | Credits | |
|---|---|---|---|
| MATH | | 3 | |

*Cannot double-count with another requirement.*

[1]*Alternative: BIOL 206/206L (cross-listed, pre-requisite BIOL 105/106).*
[2]*Pre-requisite CHEM 101/101L.*
[3]*Alternative: ECON 324 (cross-listed, pre-requisite ECON 200 or 201).*
[4]*Alternative: BIOL 344/344L (cross-listed, pre-requisite BIOL 106/206).*

*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.*