ADVANCE
A NOVA | MASON PARTNERSHIP

A.S. Science/ B.S. Chemistry - All Concentrations
**2024-2025**

## A.S. Science

## ADVANCE Program Milestones

**ADVANCE Milestone Requirements: All ADVANCE students must adhere to the following requirements. For Milestones #1-#3, failure to meet these milestones will prevent a student from matriculating to Mason and/or result in termination from ADVANCE. For Milestones #4-#7, failure to meet these milestones may delay matriculation to Mason.**

**1. Students must complete their NOVA degree within 4 years of being admitted into ADVANCE. Students are highly encouraged to be continuously enrolled at NOVA/Mason to support progress towards degree completion.**

**2. Students must maintain a minimum 2.5 cumulative GPA at NOVA and must have a minimum 2.5 GPA upon matriculation to Mason.**

**3. Students who wish to enroll at Mason for the fall semester must apply for NOVA spring graduation by March 1 or summer graduation by June 1. Students who wish to enroll at Mason for the spring semester must apply for NOVA fall graduation by October 1.**

**4. Students must begin developmental coursework no later than the first semester in ADVANCE at NOVA.**

**5. Students must take first college-level MTH course and ENG 111 in the semester immediately following the completion of any MDE or EDE courses (excluding summer).**

**6. In the first 30 credits, students must complete ENG 111 and ENG 112 with a C or better.**

**7. Students must complete a Mason Core Quantitative Reasoning course equivalent with a C or better no later than one semester before NOVA graduation. Refer to your pathway to select the appropriate MTH course(s).**

**The Chemistry, BS offers concentrations in Analytical Chemistry, Biochemistry, Environmental Chemistry, or Materials Chemistry. Students may also complete the degree without a concentration. Students are encouraged to speak with a Mason Chemistry advisor for more information when selecting a concentration by emailing: chemug@gmu.edu.**

| | NOVA DEGREE REQUIREMENT | Credits | Courses | MASON TRANSFER EQUIVALENT | MASON CORE/DEGREE EQUIVALENT |
|---|---|---|---|---|---|
| 1 | **SDV Course** | 1 | SDV 100 College Success Skills **OR**<br>SDV 101 Orientation to XXX | UNIV 100 | General Elective |
| 2 | **ENG 111** | 3 | ENG 111 College Composition I[1] | ENGH XXX | General Elective |
| 3 | **ITE 152 or General Education** | 4 | CHM 111 General Chemistry I | CHEM 211-213 | Major & Nat Science |
| 4 | **MTH 167 or Science** | 4-5 | MTH 167 Pre-Calculus with Trigonometry **OR**<br>**Biochemistry/Environmental:** PHY 202 General College Physics II[2] **OR** PHY 242 University Physics II[2]<br>**All Other Concentrations:** PHY 242 University Physics II[2]<br>***(Only take this PHY course at NOVA if placed directly into MTH 263 and MTH 167 is not needed)*** | MATH 105<br>PHYS 245-246<br>PHYS 260-261 | General Elective or Major |
| 5 | **MTH 263** | 4 | MTH 263 Calculus I | MATH 113 | Major & Quantitative |
| 6 | **ENG 112** | 3 | ENG 112 College Composition II[1] | ENGH 101 | Written Comm |
| 7 | **Math or Science #1** | 4 | **Biochemistry/Environmental:** PHY 201 General College Physics I[2] **OR** PHY 241 University Physics I[2]<br>**All Other Concentrations:** PHY 241 University Physics I[2] | PHYS 243-244<br>PHYS 160-161 | Major |
| 8 | **MTH 264** | 4 | MTH 264 Calculus II | MATH 114 | Major |
| 9 | **Science Course #1** | 4 | CHM 112 General Chemistry II | CHEM 212-214 | Major & Nat Science |
| 10 | **Social/Behavioral Sciences #1** | 3 | ECO 201 Principles of Macroeconomics **OR**<br>ECO 202 Principles of Microeconomics **OR**<br>GEO 210 People and the Land: An Introduction to Cultural Geography **OR**<br>HIS 121 United States History to 1877 **OR**<br>HIS 122 United States History Since 1865 **OR**<br>PLS 135 U.S. Government and Politics **OR**<br>PSY 200 Principles of Psychology **OR**<br>PSY 230 Developmental Psychology **OR**<br>SOC 200 Introduction to Sociology **OR**<br>SOC 211 Cultural Anthropology | ECON 104<br>ECON 103<br>GGS 103<br>HIST 121<br>HIST 122<br>GOVT 103<br>PSYC 100<br>PSYC 211<br>SOCI 101<br>ANTH 114 | Soc/Behav |

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| 11 | **HIS Course** | 3 | HIS 101 Western Civilizations Pre-1600 CE **OR**<br>HIS 102 Western Civilizations Post-1600 CE **OR**<br>HIS 112 World Civilizations Post-1500 CE ***(recommended)*** | HIST 101T<br>HIST 102T<br>HIST 125 | Global History |
| 12 | **Humanities/Fine Arts #1** | 3 | ART 100 Art Appreciation **OR**<br>ART 101 History of Art: Prehistoric to Gothic **OR**<br>ART 102 History of Art: Renaissance to Modern **OR**<br>CST 130 Introduction to Theatre **OR**<br>CST 151 Film Appreciation I **OR**<br>MUS 121 Music in Society | ARTH 101<br>ARTH 200<br>ARTH 201<br>THR 101<br>ENGH L372<br>MUSI 101 | Arts |
| 13 | **Math or Science #2** | 3 | CHM 241 Organic Chemistry I - Lecture | CHEM L313 | Major |
| 14 | **Math or Science #3** | 2 | CHM 245 Organic Chemistry I - Lab | CHEM L315 | Major |
| 15 | **Science Course #2** | 3 | CHM 242 Organic Chemistry II - Lecture | CHEM L314 | Major |
| 16 | **Math or Science #3 (with lab above under line #14)** | 2 | CHM 246 Organic Chemistry II - Lab | CHEM L318 | Major |
| 17 | **Social/Behavioral Sciences #2** | 3 | GEO 220 World Regional Geography **OR**<br>PLS 140 Introduction to Comparative Politics **OR**<br>PLS 241 Introduction to International Relations **OR**<br>PSY 219 Cross-Cultural Psychology **OR**<br>SSC 115 Introduction to Global Affairs | GGS 101<br>GOVT 133<br>GOVT 132<br>PSYC L379<br>GLOA 101 | General Elective |
| 18 | **CST Course** | 3 | CST 100 Principles of Public Speaking **OR**<br>CST 110 Introduction to Human Communication | COMM 100<br>COMM 101 | Oral Comm |
| 19 | **General Education Elective** ***(only needed if MTH 167 is not taken)*** | 3-4 | **Analytical:** MTH 245 Statistics I<br>**Environmental:** GOL 105 Physical Geology<br>**All Other Concentrations:**<br>BIO 101 General Biology I **OR**<br>ECO 202 Principles of Microeconomics **OR**<br>HUM 210 Introduction to Women and Gender Studies **OR**<br>HUM 259 The Greek and Roman Tradition **OR**<br>PHI 111 Logic **OR**<br>PSY 200 Principles of Psychology **OR**<br>REL 100 Introduction to the Study of Religion **OR**<br>SOC 200 Introduction to Sociology | STAT 250<br>GEOL 101/103<br><br>BIOL 103<br>ECON 103<br>WMST 200<br>CLAS 250<br>PHIL 173<br>PSYC 100<br>RELI 100<br>SOCI 101 | General Elective or Major |
| 20 | **Humanities/Fine Arts #2** | 3 | ENG 225 Reading Literature: Culture and Ideas **OR**<br>ENG 245 British Literature **OR**<br>ENG 246 American Literature **OR**<br>ENG 255 World Literature **OR**<br>ENG 258 African American Literature **OR**<br>ENG 275 Women in Literature **OR**<br>Any 200-Level ENG Literature course[3] | ENGH 202 or<br>FRLN L330 (ENG 255 only) | Literature |
| | **A.S. SCIENCE DEGREE TOTAL** | **62-64** | | | |

**For academic policies and procedures, please see NOVA catalog - http://www.nvcc.edu/catalog/index.html**

## B.S. Chemistry - All Concentrations

**Concentrations:** Analytical Chemistry, Biochemistry, Environmental Chemistry, Materials Chemistry, or No Concentration

Note: Requirements and course sequencing varies depending on the selected concentration. Please see a Mason Chemistry advisor each semester to plan course selections carefully.

| | MASON DEGREE REQUIREMENT | Credits | Course | MASON CORE/DEGREE EQUIVALENT |
|---|---|---|---|---|
| 21 | **Gen Ed: Written Communication (UL)** | 3 | ENGH 302 Advanced Composition | Written Comm |
| 22 | **Chemistry Courses: All Concentrations** | 4 | CHEM 321 Quantitative Chemical Analysis[4] | Major |
| 23 | **Concentration Courses: All Concentrations** | 3 | CHEM 331 Physical Chemistry I[5] **(Fall Only)** | Major |
| 24 | **Concentration Courses: All Concentrations** | 2 | CHEM 336 Physical Chemistry Lab I[5] | Writing Intensive |

Students select one concentration from lines 26 - 30 below

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| **25** | **Concentration Courses: Analytical Chemistry** | 35-42 | MATH 213 Analytic Geometry and Calculus III<br>PHYS 260-261 University Physics II & Lab ***(if Physics sequence is not completed at NOVA)***<br>BIOL 213 Cell Structure & Function<br>CHEM 463 General Biochemistry I<br>CHEM 332 Physical Chemistry II[5] **(Spring Only)**<br>CHEM 441 Properties and Bonding of Inorganic Compounds **(Fall Only)**<br>CHEM 427 Aquatic Environmental Chemistry **(Fall Only) OR**<br>CHEM 355 Undergraduate Research **OR**<br>CHEM 451 Special Projects in Chemistry **OR**<br>CHEM 452 Special Projects in Chemistry<br>CHEM 422 Instrumental Methods of Chemical Analysis **(Fall Only)**<br>CHEM 465 Biochemistry Lab **OR**<br>CHEM 445 Inorganic Preparations and Techniques **(Spring Only)**<br>CHEM 424 Principles of Chemical Separation **(Fall Only) OR**<br>CHEM 425 Electroanalytical Chemistry **(Spring Only)**<br>CHEM 337 Physical Chemistry Lab II[5] **(Spring Only)**<br>CHEM 423 Instrumental Methods of Chemical Analysis Lab **(Spring Only)**<br>Supporting Science Electives[7] (6 credits)(See: Advisor) ***(if MTH 245 is completed at NOVA, only 3 credits are needed)*** | Major |
| **26** | **Concentration Courses: Biochemistry** | 29-33 | PHYS 245-246 College Physics II & Lab **OR**<br>PHYS 260-261 University Physics II & Lab ***(if Physics sequence is not completed at NOVA)***<br>BIOL 213 Cell Structure & Function<br>CHEM 463 General Biochemistry I<br>BIOL 305 Biology of Microorganisms **AND** BIOL 306 Biology of Microorganisms Lab<br>CHEM 446 Bioinorganic Chemistry **(Fall Only)**<br>CHEM 464 General Biochemistry II **(Spring Only)**<br>CHEM 465 Biochemistry Lab<br>Approved Science Electives: CHEM/BIOL[7] (9 credits) | Major |
| **27** | **Concentration Courses: Environmental Chemistry** | 38-46 | MATH 213 Analytic Geometry and Calculus III **OR**<br>STAT 250 Introductory Statistics I<br>BIOL 213 Cell Structure & Function **OR**<br>EVPP 210 Environmental Biology: Molecules and Cells<br>PHYS 245-246 College Physics II & Lab **OR**<br>PHYS 260-261 University Physics II & Lab ***(if Physics sequence is not completed at NOVA)***<br>CHEM 332 Physical Chemistry II[4] **(Spring Only)**<br>GEOL 101 Physical Geology **AND** GEOL 103 Physical Geology Lab ***(if GOL 105 is not completed at NOVA)***<br>GEOL 306 Soil Science<br>CHEM 441 Properties and Bonding of Inorganic Compounds **(Fall Only) OR**<br>CHEM 446 Bioinorganic Chemistry **(Fall Only)**<br>CHEM 422 Instrumental Methods of Chemical Analysis **(Fall Only)**<br>CHEM 427 Aquatic Environmental Chemistry **(Fall Only)**<br>CHEM 337 Physical Chemistry Lab II[4] **(Spring Only)**<br>CHEM 423 Instrumental Methods of Chemical Analysis Lab **(Spring Only)**<br>CHEM 438 Atmospheric Chemistry **(Spring Only)**<br>CHEM Elective (3 credits) (See: Advisor)<br>Supporting Science Electives[7] (6 credits) (See: Advisor) | Major |
| **28** | **Concentration Courses: Materials Chemistry** | 28-32 | MATH 213 Analytic Geometry and Calculus III<br>PHYS 260-261 University Physics II & Lab ***(if Physics sequence is not completed at NOVA)***<br>CHEM 332 Physical Chemistry II[5] **(Spring Only)**<br>CHEM 441 Properties and Bonding of Inorganic Compounds **(Fall Only)**<br>CHEM 472 Modern Polymer Chemistry **(Fall Only)**<br>CHEM 445 Inorganic Preparations and Techniques **(Spring Only)**<br>CHEM 337 Physical Chemistry Lab II[5] **(Spring Only)**<br>Additional Science Electives[7] (12 credits) (See: Advisor) | Major |

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|---|---|---|---|---|
| **29** | **Concentration Courses: No Concentration** | 32-36 | MATH 213 Analytic Geometry and Calculus III<br>PHYS 260-261 University Physics II & Lab ***(if Physics sequence is not completed at NOVA)***<br>BIOL 213 Cell Structure & Function<br>CHEM 332 Physical Chemistry II[5] **(Spring Only)**<br>CHEM 463 General Biochemistry I<br>CHEM 441 Properties and Bonding of Inorganic Compounds **(Fall Only)**<br>CHEM 422 Instrumental Methods of Chemical Analysis **(Fall Only)**<br>CHEM 423 Instrumental Methods of Chemical Analysis Lab **(Spring Only)**<br>CHEM 445 Inorganic Preparations and Techniques<br>CHEM 337 Physical Chemistry Lab II[5] **(Spring Only)**<br>CHEM Elective[7](3 credits)<br>In-Depth Elective[7] (3 credits) | Major |
| **30** | **Gen Ed: Apex** | 3 | Approved Apex Course[6] | Apex |
| **31** | **General Electives** | 1-15 | General Elective (if needed to bring total credits to 120; some electives must be upper-level; See: Advisor) | General Elective |
| **B.S. CHEMISTRY DEGREE TOTAL** | | **120 - 125** | | |

**Important Academic Information:**

[1]Students who complete ENG 111 after Spring 2024 will earn ENGH elective for ENG 111 and ENGH 101 for ENG 112.

[2]Students must complete the Physics sequence they begin. PHYS 201 AND PHYS 202 or PHYS 241 AND PHYS 242.

[3]200-level ENG literature classes include: ENG 225, ENG 230, ENG 236, ENG 237, ENG 245, ENG 246, ENG 250, ENG 255, ENG 256, ENG 257, ENG 258, ENG 271, ENG 275, and ENG 279.

[4]For students matriculating to Mason in the fall semester, it is highly recommended that students complete CHEM 321 in the summer semester, if possible.

[5]Prerequisite sequencing and course availability require careful attention to stay on track each term. Please see your Mason advisor to plan your course selections regularly. Students may need to split Physical Chemistry (CHEM 331/336, CHEM 332/337) into separate terms.

[6]For approved Mason Core courses, please visit - https://catalog.gmu.edu/mason-core/

[7]For approved concentration courses, please visit: https://catalog.gmu.edu/colleges-schools/science/chemistry-biochemistry/chemistry-bs/#requirementstext

**General Education Waiver Policy and Guidance:**

• Students who complete a VCCS transfer associate degree (AS, AA, or AFA) will receive a waiver of the Foundation and Exploration (lower division) Mason Core general education categories, which can be found here: https://catalog.gmu.edu/mason-core/ . To be eligible for the waiver, the students must provide the Mason Office of Admissions with a final, official transcript reflecting the degree conferral date. As a prerequisite for ENGH 302, ENGH 101 is not waived. Students must complete ENGH 100 or ENGH 101, or an equivalent, with a C or higher.

• When a course fulfills a Mason Core requirement **and** a major or college requirement (e.g. Major & Quant), students must complete the course listed on the pathway to fulfill the major/college requirement. Courses that fulfill only Mason Core Foundation and Exploration categories are recommendations. In most pathways, ADVANCE students must complete a Quantitative Reasoning course to matriculate through ADVANCE.

• ADVANCE students must complete the associate degree indicated on their pathway (see the ADVANCE Program Milestones listed above). Students who withdraw from ADVANCE and transfer without the associate degree or UCGS are required to complete each Mason Core general education category.

**Additional General Notes & Resources:**

• Students majoring in chemistry must complete the chemistry program requirements with a minimum GPA of 2.30 and present no more than two courses with a grade of 'D' (1.00) in CHEM coursework at graduation.

• Students interested in Pre-Health Professions (Pre-Med, Pre-Dentistry, Pre-Podiatry, Pre-Optometry, Pre-Veterinary, Pre-Pharmacy, Pre-Physician Assistant, Pre-Occupational Therapy, and Pre-Physical Therapy) are strongly encouraged to meet with the Health Professions Advisor regarding the appropriate prerequisite courses for their field of choice. For more information, please visit: https://prehealth.gmu.edu/

• Students interested in pursuing licensure to teach at the secondary level may add the Undergraduate Certificate: Secondary Education - Chemistry to this degree. For more information visit: https://education.gmu.edu/secondary-education-6-12/academics/ . Some certificate courses can be used to fulfill general elective requirements, but additional credits may be needed to complete the certificate. Students interested in teacher licensure should meet with a Mason pre-teacher advisor. Contact information: https://cehd.gmu.edu/current-students/advising/

• For academic policies and procedures, please see Mason catalog - https://catalog.gmu.edu/policies/

• Students seeking a bachelor's degree must apply at least 45 credits of upper-level courses (numbered 300 or above) toward graduation.