

Program Change Request

Date Submitted: 02/16/22 3:01 pm

Viewing: **SC-BS-CHEM : Chemistry, BS**

Last approved: 11/20/20 9:29 am

Last edit: 02/16/22 3:01 pm

Changes proposed by: jbazaz

Catalog Pages
Using this Program
[Chemistry, BS](#)

No Longer
Accepting Students
Anticipated closure
date (i.e., calendar
date students are
Rationale for

2022-2023

Are you completing this form on someone else's behalf?

No

Requester:

Effective Catalog: 2022-2023

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title:

Chemistry, BS

Banner Title: Chemistry, BS

In Workflow

1. CHEM Assoc Chair
2. CHEM Chair
3. SC Curriculum Committee
4. SC Associate Dean
5. Assoc Provost-Undergraduate
6. Registrar-Programs

Approval Path

1. 02/16/22 4:28 pm
Megan Erb
(msikowit):
Approved for CHEM
Assoc Chair
2. 02/25/22 9:10 am
Gerald
Weatherspoon
(grobert1):
Approved for CHEM
Chair

History

1. Oct 23, 2017 by
clmig-jwehrheim
2. Mar 1, 2018 by
rzachari
3. Mar 28, 2018 by
rzachari
4. Feb 11, 2019 by
Tory Sarro (vsarro)
5. Nov 20, 2020 by
Jennifer Bazaz
Gettys (jbazaz)

Is this a retitling of**Existing Program**

**Registrar/OAPI Use
Only – SCHEV
Status** Approved

**Registrar's Office
Use Only –
Program Start Term** Fall 2018

**Registrar/OAPI Use
Only – SCHEV
Letter**

**Registrar/OAPI Use
Only – SACSCOC
Status**

Concentration(s):

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Biochemistry	BC
2	Environmental Chemistry	EVCH
3	Analytical Chemistry	ANAC
4	Materials Chemistry	MATC

INTO Major(s):

**Registrar/IRR Use
Only –
Concentration CIP
Code**

College/School: College of Science

**Department /
Academic Unit:** Chemistry & Biochemistry

**Jointly Owned
Program?** No

Participating**Participating****Justification**

What: Adding GEOL 103 to GEOL 101.

Why: The previously 4-credit GEOL 101 has been decoupled into GEOL 101 (3cr), GEOL 103 (1cr).

Catalog Published Information

**Total Credits
Required:** Total credits: minimum 120

Registrar's Office Use Only - Program Code:

SC-BS-CHEM

Registrar/IRR Use Only – Program CIP Code 40.0501 - Chemistry, General.

Admission Requirements:

Admissions

University-wide admissions policies can be found in the [Undergraduate Admissions Policies](#) section of this catalog. To apply for this program, please complete the [George Mason University Admissions Application](#).

Program-Specific Policies:

Policies

Students must fulfill all [Requirements for Bachelor's Degrees](#), including the [Mason Core](#). [CHEM 336](#) Physical Chemistry Lab I or [CHEM 465](#) Biochemistry Lab will fulfill the writing intensive requirement for students majoring in chemistry.

Termination from the Major

To ensure the academic integrity of the Chemistry and Biochemistry undergraduate major program, students are expected to maintain a satisfactory level of academic performance.

No chemistry, math, or science course that is required for the major may be attempted more than three times. Students who do not successfully complete such a course with a grade of C or better by the third attempt may be terminated from the major.

Students who have been terminated from the Chemistry major may not register for a chemistry course without the permission of the Department of Chemistry and Biochemistry.

A student may not declare a major in chemistry if the student has previously met the termination criteria for the major at any time, regardless of what the student's major was at the time the courses were taken.

Degree Requirements:

Students should refer to the [Admissions & Policies](#) tab for specific policies related to this program.

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.

BS without Concentration

Students who do not select an optional concentration complete the curriculum requirements listed below.

Chemistry Courses

CHEM 211	General Chemistry I (Mason Core)	3
CHEM 212	General Chemistry II (Mason Core)	3
CHEM 213	General Chemistry Laboratory I (Mason Core)	1

CHEM 214	General Chemistry Laboratory II (Mason Core)	1
CHEM 313	Organic Chemistry I	3
CHEM 314	Organic Chemistry II	3
CHEM 315	Organic Chemistry Lab I	2
CHEM 318	Organic Chemistry Lab II	2
CHEM 321	Quantitative Chemical Analysis	4
CHEM 331	Physical Chemistry I	3
CHEM 332	Physical Chemistry II	3
CHEM 336	Physical Chemistry Lab I 1	2
CHEM 337	Physical Chemistry Lab II	2
CHEM 422	Instrumental Methods of Chemical Analysis	3
CHEM 423	Instrumental Methods of Chemical Analysis Laboratory	2
CHEM 441	Properties and Bonding of Inorganic Compounds	3
CHEM 445	Inorganic Preparations and Techniques	2
CHEM 463	General Biochemistry I	4
Select 3 credits of chemistry electives 2		3

In Depth Electives

Select one from the following: 3

CHEM 413	Synthetic and Mechanistic Organic Chemistry
CHEM 427	Aquatic Environmental Chemistry
CHEM 438	Atmospheric Chemistry
CHEM 458	Chemical Oceanography
CHEM 464	General Biochemistry II
CHEM 467	The Chemistry of Enzyme-Catalyzed Reactions
CHEM 468	Bioorganic Chemistry

Total Credits 52

1 Fulfills the writing intensive requirement.

2 Any lecture, lab or research course(s)

Mathematics Courses

MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3

Total Credits 11

Physics Courses

PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1

Total Credits 8

Concentration in Environmental Chemistry (EVCH)

Students who choose this concentration will have a broad knowledge of chemistry and a firm foundation in the environmental sciences covering atmospheric, aquatic, and soil. The major prepares students to work in the public or private sector as environmental chemists as well as to pursue an advanced degree.

Chemistry Courses

<u>CHEM 211</u>	General Chemistry I (<u>Mason Core</u>)	3
<u>CHEM 213</u>	General Chemistry Laboratory I (<u>Mason Core</u>)	1
<u>CHEM 212</u>	General Chemistry II (<u>Mason Core</u>)	3
<u>CHEM 214</u>	General Chemistry Laboratory II (<u>Mason Core</u>)	1
<u>CHEM 313</u>	Organic Chemistry I	3
<u>CHEM 314</u>	Organic Chemistry II	3
<u>CHEM 315</u>	Organic Chemistry Lab I	2
<u>CHEM 318</u>	Organic Chemistry Lab II	2
<u>CHEM 321</u>	Quantitative Chemical Analysis	4
<u>CHEM 331</u>	Physical Chemistry I	3
<u>CHEM 332</u>	Physical Chemistry II	3
<u>CHEM 336</u>	Physical Chemistry Lab I 1	2
<u>CHEM 337</u>	Physical Chemistry Lab II	2
<u>CHEM 422</u>	Instrumental Methods of Chemical Analysis	3
<u>CHEM 423</u>	Instrumental Methods of Chemical Analysis Laboratory	2
<u>CHEM 427</u>	Aquatic Environmental Chemistry	3
<u>CHEM 438</u>	Atmospheric Chemistry	3
<u>CHEM 441</u>	Properties and Bonding of Inorganic Compounds	3
or <u>CHEM 446</u>	Bioinorganic Chemistry	
<u>CHEM Elective (lecture or research course)</u>		3
Total Credits		49

1 Fulfills the writing intensive requirement.

Physics Courses

Select one option:		8
Option One:		
<u>PHYS 160</u>	University Physics I (<u>Mason Core</u>)	
<u>PHYS 161</u>	University Physics I Laboratory (<u>Mason Core</u>)	
<u>PHYS 260</u>	University Physics II (<u>Mason Core</u>)	
<u>PHYS 261</u>	University Physics II Laboratory (<u>Mason Core</u>)	
Option Two:		
<u>PHYS 243</u>	College Physics I (<u>Mason Core</u>)	
<u>PHYS 244</u>	College Physics I Lab (<u>Mason Core</u>)	
<u>PHYS 245</u>	College Physics II (<u>Mason Core</u>)	
<u>PHYS 246</u>	College Physics II Lab (<u>Mason Core</u>)	
Total Credits		8

Mathematics Courses

<u>MATH 113</u>	Analytic Geometry and Calculus I (<u>Mason Core</u>)	4
<u>MATH 114</u>	Analytic Geometry and Calculus II	4

<u>MATH 213</u>	Analytic Geometry and Calculus III	3
or <u>STAT 250</u>	Introductory Statistics I (<u>Mason Core</u>)	
Total Credits		11
Science Core Courses		
<u>GEOL 101</u>	Physical Geology (<u>Mason Core</u>)	4
& <u>GEOL 103</u>	and Physical Geology Lab	
<u>GEOL 306</u>	Soil Science	3
<u>EVPP 210</u>	Environmental Biology: Molecules and Cells	4
or <u>BIOL 213</u>	Cell Structure and Function (<u>Mason Core</u>)	
Total Credits		11

Supporting Science Electives

Select two courses from the following: 1 6-8

<u>CHEM 458</u>	Chemical Oceanography
or <u>BIOL 309</u>	Oceanography
or <u>EVPP 309</u>	Oceanography
or <u>GEOL 309</u>	Oceanography
<u>EVPP 301</u>	Environmental Science: Biological Diversity and Ecosystems
<u>EVPP 445</u>	Principles of Environmental Toxicology
<u>GEOL 305</u>	Environmental Geology
<u>GEOL 313</u>	Hydrogeology
<u>BIOL 305</u>	Biology of Microorganisms
& <u>BIOL 306</u>	and Biology of Microorganisms Laboratory
or <u>EVPP 305</u>	Environmental Microbiology Essentials
& <u>EVPP 306</u>	and Environmental Microbiology Essentials Laboratory
<u>GGS 302</u>	Global Environmental Hazards

Total Credits 6-8

1 The discipline sequences may be interchanged only with approval by the program coordinator.

The remaining credits are fulfilled by Mason Core requirements or general electives.

Concentration in Analytical Chemistry (ANAC)

The Analytical Chemistry concentration is designed to introduce and train students in modern aspects of analytical chemistry. Students who choose this program will be well prepared to run sophisticated analytical instruments in industry and research laboratories and to pursue an advanced degree specializing in analytical chemistry.

Chemistry Courses

<u>CHEM 211</u>	General Chemistry I (<u>Mason Core</u>)	3
<u>CHEM 213</u>	General Chemistry Laboratory I (<u>Mason Core</u>)	1
<u>CHEM 212</u>	General Chemistry II (<u>Mason Core</u>)	3
<u>CHEM 214</u>	General Chemistry Laboratory II (<u>Mason Core</u>)	1
<u>CHEM 313</u>	Organic Chemistry I	3
<u>CHEM 314</u>	Organic Chemistry II	3
<u>CHEM 315</u>	Organic Chemistry Lab I	2
<u>CHEM 318</u>	Organic Chemistry Lab II	2

CHEM 321	Quantitative Chemical Analysis	4
CHEM 331	Physical Chemistry I	3
CHEM 332	Physical Chemistry II	3
CHEM 336	Physical Chemistry Lab I 1	2
CHEM 337	Physical Chemistry Lab II	2
CHEM 422	Instrumental Methods of Chemical Analysis	3
CHEM 423	Instrumental Methods of Chemical Analysis Laboratory	2
CHEM 427	Aquatic Environmental Chemistry	3
or CHEM 355	Undergraduate Research	
or CHEM 451	Special Projects in Chemistry	
or CHEM 452	Special Projects in Chemistry	
CHEM 463	General Biochemistry I	4
CHEM 441	Properties and Bonding of Inorganic Compounds	3
CHEM 465	Biochemistry Lab	2
or CHEM 445	Inorganic Preparations and Techniques	
CHEM 424	Principles of Chemical Separation	3
or CHEM 425	Electroanalytical Chemistry	
Total Credits		52

1 Fulfills the writing intensive requirement.

Physics Courses

PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1
Total Credits		8

Mathematics Courses

MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
Total Credits		11

Supporting Science Electives

Select 6 credits from the following: 6

BENG 101	Introduction to Bioengineering
or STAT 250	Introductory Statistics I (Mason Core)
ECE 101	Introduction to Electrical and Computer Engineering
or CHEM 620	Modern Instrumentation

Total Credits 6

The remaining hours are used to fulfill the Mason Core requirements and general elective courses.

[CDS 130](#) Computing for Scientists is required to fulfill the Mason Core IT requirement.

Concentration in Biochemistry (BC)

Students planning professional careers in biochemistry, the pharmaceutical industry, medicine, biotechnology, or related fields with a chemistry emphasis should choose this program instead of the Chemistry, BS without a concentration. This concentration provides students with a focus on biochemistry while retaining a strong chemistry foundation. Students are allowed to tailor the concentration to their interests with 9 credits of biology or chemistry elective credits.

Chemistry Courses

<u>CHEM 211</u>	General Chemistry I (<u>Mason Core</u>)	3
<u>CHEM 213</u>	General Chemistry Laboratory I (<u>Mason Core</u>)	1
<u>CHEM 212</u>	General Chemistry II (<u>Mason Core</u>)	3
<u>CHEM 214</u>	General Chemistry Laboratory II (<u>Mason Core</u>)	1
<u>CHEM 313</u>	Organic Chemistry I	3
<u>CHEM 314</u>	Organic Chemistry II	3
<u>CHEM 315</u>	Organic Chemistry Lab I	2
<u>CHEM 318</u>	Organic Chemistry Lab II	2
<u>CHEM 321</u>	Quantitative Chemical Analysis	4
<u>CHEM 331</u>	Physical Chemistry I	3
<u>CHEM 336</u>	Physical Chemistry Lab I 1	2
<u>CHEM 446</u>	Bioinorganic Chemistry	3
<u>CHEM 463</u>	General Biochemistry I	4
<u>CHEM 464</u>	General Biochemistry II	3
<u>CHEM 465</u>	Biochemistry Lab 1	2
Total Credits		39

1 Fulfills the writing intensive requirement.

Mathematics Courses

<u>MATH 113</u>	Analytic Geometry and Calculus I (<u>Mason Core</u>)	4
<u>MATH 114</u>	Analytic Geometry and Calculus II	4
Total Credits		8

Physics Courses

Select one option: 8

Option One:

<u>PHYS 243</u>	College Physics I (<u>Mason Core</u>)
<u>PHYS 244</u>	College Physics I Lab (<u>Mason Core</u>)
<u>PHYS 245</u>	College Physics II (<u>Mason Core</u>)
<u>PHYS 246</u>	College Physics II Lab (<u>Mason Core</u>)

Option Two:

<u>PHYS 160</u>	University Physics I (<u>Mason Core</u>)
<u>PHYS 161</u>	University Physics I Laboratory (<u>Mason Core</u>)
<u>PHYS 260</u>	University Physics II (<u>Mason Core</u>)
<u>PHYS 261</u>	University Physics II Laboratory (<u>Mason Core</u>)

Total Credits 8

Biology Courses

<u>BIOL 213</u>	Cell Structure and Function (<u>Mason Core</u>)	4
<u>BIOL 305</u>	Biology of Microorganisms	3

BIOL 306	Biology of Microorganisms Laboratory	1
Total Credits		8
Approved Science Electives		
Select 9 credits of approved science electives chosen from CHEM or BIOL courses numbered 302-499	1	9
Total Credits		9
1 Other science or math courses may be approved as electives, subject to prior approval of the undergraduate coordinator.		

Concentration in Materials Chemistry (MATC)

Students in the Materials Chemistry concentration explore nanostructures and how they relate to the macroscale physical and chemical properties of a material. Students interested in a career specializing in the synthesis and characterization of materials, as well as applied areas of materials chemistry, obtain a firm foundation in this subfield of chemistry.

Chemistry Courses

CHEM 211	General Chemistry I (Mason Core)	3
CHEM 213	General Chemistry Laboratory I (Mason Core)	1
CHEM 212	General Chemistry II (Mason Core)	3
CHEM 214	General Chemistry Laboratory II (Mason Core)	1
CHEM 313	Organic Chemistry I	3
CHEM 314	Organic Chemistry II	3
CHEM 315	Organic Chemistry Lab I	2
CHEM 318	Organic Chemistry Lab II	2
CHEM 321	Quantitative Chemical Analysis	4
CHEM 331	Physical Chemistry I	3
CHEM 332	Physical Chemistry II	3
CHEM 336	Physical Chemistry Lab I 1	2
CHEM 337	Physical Chemistry Lab II	2
CHEM 441	Properties and Bonding of Inorganic Compounds	3
CHEM 445	Inorganic Preparations and Techniques	2
CHEM 472	Modern Polymer Chemistry	3
Total Credits		40

Mathematics Courses

MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
Total Credits		11

Physics Courses

PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1
Total Credits		8

Additional Science Courses

Choose 12 credits from the following:

12

<u>CHEM 355</u>	Undergraduate Research
<u>CHEM 413</u>	Synthetic and Mechanistic Organic Chemistry
<u>CHEM 422</u>	Instrumental Methods of Chemical Analysis
<u>CHEM 423</u>	Instrumental Methods of Chemical Analysis Laboratory
<u>CHEM 451</u>	Special Projects in Chemistry
<u>CHEM 463</u>	General Biochemistry I
<u>CHEM 465</u>	Biochemistry Lab
<u>CHEM 471</u>	Solid State Chemistry
<u>CHEM 480</u>	Fundamentals of Nanoscience and Nanomaterials
<u>BENG 240</u>	Biomaterials
<u>ME 313</u>	Material Science

Total Credits

12

**Retroactive
Requirements
Updates:**

Plan of Study:

**Honors
Information:**

Honors in the Major

Chemistry majors who have completed prerequisites for [CHEM 455](#) Honors Research in Chemistry and [CHEM 456](#) Honors Research in Chemistry and have maintained an overall GPA of at least 3.00 in mathematics and science courses are eligible to enter the departmental honors program. To graduate with honors in chemistry, a student is required to maintain a minimum GPA of 3.00 in mathematics and science courses and successfully complete the two semesters of [CHEM 455](#) Honors Research in Chemistry and [CHEM 456](#) Honors Research in Chemistry with a minimum GPA of 3.50. In order to apply for Chemistry Honors, please complete the [application](#) and submit it to the undergraduate coordinator.

**Accelerated
Description/Dual
Degree
Description:**

**INTO-Mason
Requirements:**

**College
Requirements &
Policies:**

**Department /
Academic Unit
Requirements &
Policies:**

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

**Courses offered via
distance (if
applicable):**

Indicate whether
students are able

What is the
primary delivery
format for the
program?

Face-to-Face Only

Does any portion of this program occur off-campus?

No

Off-campus details:

Are you working with a vendor / other collaborators to offer your program?

No

Please explain:

Related
Departments

Could this program prepare students for any type of professional licensure, in
Virginia or elsewhere?

Yes

Please explain:

Teacher licensure in conjunction with CEHD.

Are you adding or removing a licensure component?

No

Please explain:

Additional SCHEV & SACSCOC Information

Is the content of the new program closely related to that of an existing approved program at the
same instructional level (i.e., baccalaureate, master's, doctoral)?

Which existing approved program(s)?

Is this new program considered to be "advancing the degree level of a currently approved program"
(i.e. existing content is at lower degree level, new content is at the higher degree level)?

Which existing approved program(s)?

Is this new program considered to be "lowering the degree level of a currently approved program" (i.e
existing content is at higher degree level, new content is at the lower degree level)?

Which existing approved program(s)?

Is this a re-opening of a program that was closed to admission within the last five years?

Date of Program Closure

What are the methods of delivery for the program?

Does this program include a course/credit-based competency-based education delivery option?

Is this change a simple retitling of an existing program, with no other changes, to any existing program content, curriculum requirements, etc?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program at the same instructional level (i.e., baccalaureate, master's, or doctoral)?

No

Which existing approved program(s)?

Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as content that is not currently included in an existing approved degree/certificate program at the same instructional level. Do not exclude gen ed credits in calculations for undergraduate programs.)

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program?

No

What is the new method of delivery?

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

Will any additional equipment/facilities be needed?

No

Description of institutional impact:

Will any additional faculty be required?

No

Description of institutional impact:

Will any additional financial resources be needed?

No

Description of institutional impact:

Additional library/learning resources needed?

No

Description of institutional impact:

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Green Leaf

Designation

Sustainability-focused academic programs require at least one green leaf course. Either that course is itself sustainability-focused or else the program requires a set of sustainability-related courses with aggregated

Relationship to

Existing Courses

Relationship to

Existing Programs

List sustainability-focused courses currently required in the degree

Sustainability-related academic programs either require at least one sustainability-related course or else offer any green leaf course as an option or elective *

List sustainability-related courses currently required in the degree

Does this program cover material which crosses into another department?

No

Impacted

Departments

Additional

Attachments

SCHEV Proposal

Executive Summary

Reviewer

Comments

Additional

Comments

Is this course required of all students in this degree program?

[%wi_required.eshtml%](#)

Attached

Document

[%attach_document.eshtml%](#)