

# COMPUTING, BACHELOR OF SCIENCE (BS) - CONCENTRATION IN COMPUTING ANALYTICS

## Program Learning Outcomes

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

## Related Links

Computing - Computing Analytics, BS Flowchart (<https://www.sru.edu/documents/academics/departments/computer-science/course-flowchart-compsci-concentratin-computing-analytics.pdf>)

Computing - Computing Analytics, BS Program Page (<https://www.sru.edu/academics/majors-and-minors/computing-computing-analytics/>)

Computer Science Department Page (<https://www.sru.edu/academics/colleges-and-departments/ches/departments/computer-science/>)

Professional Licensure/Certification Page (<https://www.sru.edu/students/student-consumer-information/professional-licensures/>)

## Curriculum Guide

### GPA Requirement

Major GPA: 2.0 or higher  
Overall GPA: 2.0 or higher

### Summary\*

Code	Title	Hours
	Rock Studies 2 Requirements	42-43
	Other Basic Requirements	0-3
	Computer Competency	0-3
	Major/Concentration Requirements	54
	Electives	24

\* All undergraduate degree programs require a minimum of 120 credits. Some courses meet multiple requirements, but are only counted once toward the 120 credit total required to graduate.

### Rock Studies 2 Requirements

Code	Title	Hours
	<b>The Rock</b>	
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3

ENGL 102	Critical Writing	3
ENGL 104	Critical Reading	3
Select one of the following:		3-4
MATH 125	Precalculus	
MATH 225	Calculus I	
MATH 230	Calculus II	
MATH 231	Calculus III	
STAT 152	Elementary Statistics I	
Select one of the following:		3
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
Subtotal		15-16
<b>Integrated Inquiry</b>		
<i>Creative and Aesthetic Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/</a> )		3
<i>Humanities Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/</a> )		3
<i>Social Science Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/</a> )		3
<i>Natural Sciences Inquiry</i>		
SCI 101	Science of Life	3
<i>Physical Science Inquiry</i>		
SCI 102	Understanding the Physical World	3
Subtotal		15
<b>Thematic Thread</b>		
Select 12 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-quick-guide/</a> ) <sup>2</sup>		12
<b>Total Hours</b>		<b>42-43</b>

- <sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject
- <sup>2</sup> One course from each category; six credits must be 300-level or above; no more than 4 credits from one subject area; specific courses required in first major, regardless of prefix of course, cannot be used to satisfy thread requirements; any course with same prefix as first major cannot be used to satisfy thread requirements, even if it is not a course in the first major.

### Basic Math Requirement

Check with your adviser or a current degree audit report to see if you have been exempted from this course. The credit earned in this course will not be counted toward the 120 credit hour minimum needed to earn a degree.

Code	Title	Hours
Complete one of the following:		0-3
Meet required minimum SAT or ACT math score OR		
ESAP 110	Beginning Algebra	
<b>Total Hours</b>		<b>0-3</b>

## Computer Competency

Code	Title	Hours
Demonstrate "computer competency" by one of the following:		0-3
Pass Computer Competency Exam OR		
Select one of the following at SRU or another post-secondary institution:		
CPSC 100	Introduction to Computing for Liberal Arts	
CPSC 110	Computer Concepts	
CPSC 130	Introduction to Computing and Programming	
PE 202	Technology for Wellness	
<b>Total Hours</b>		<b>0-3</b>

## DIVERSITY, EQUITY, AND INCLUSION REQUIREMENT

Students must take and pass a course with the Diversity, Equity, and Inclusion (DEI) designation prior to graduation. Students can meet this requirement by taking any DEI - designated course in any program at any time during their undergraduate career.

## Major/Concentration Requirements

- 27 major credits must be taken at SRU or PASSHE
- 27 major credits must be taken at the 300 level or above

Code	Title	Hours
<b>Required Core Courses</b>		
CPSC 130	Introduction to Computing and Programming <sup>1</sup>	3
CPSC 146	Programming Principles <sup>1</sup>	3
CPSC 207	Shell Commands and Scripting <sup>1</sup>	3
CPSC 300	Challenges of Computer Technology <sup>1</sup>	3
CPSC 311	Discrete Computational Structures <sup>1</sup>	3
CPSC 323	Fundamentals of Database Systems <sup>1</sup>	3
CPSC 327	Administration and Security <sup>1</sup>	3
CPSC 423	Computer Networks <sup>1</sup>	3
STAT 152	Elementary Statistics I <sup>1</sup>	3
Subtotal		27
<b>Computing Analytics Core Courses</b>		
CPSC 246	Advanced Programming Principles <sup>1</sup>	3
CPSC 370	Computer Organization and Architecture	3
CPSC 374	Algorithms and Data Structures <sup>1</sup>	3
CPSC 405	Data Mining and Data Analysis <sup>1</sup>	3
CPSC 474	Advanced Architecture & Parallel Computing	3
CPSC 480	Topics in Computer Science: Machine Learning <sup>1</sup>	3
CPSC 485	Big Data Analytics <sup>1</sup>	3
Subtotal		21
<b>Computer Science Electives</b>		
Choose two from the following:		6
MATH 225	Calculus I	
CPSC 406	Data Visualization <sup>1</sup>	
CPSC 450	Internship <sup>1</sup>	
CPSC 456	Introduction to Computer Graphics <sup>1</sup>	
CPSC 476	Artificial Intelligence <sup>1</sup>	

CPSC 478	Analysis of Algorithms <sup>1</sup>	
Subtotal		6
<b>Total Hours</b>		<b>54</b>

<sup>1</sup> Course counts for 50% of Major requirements and Major GPA

\* Some courses may require pre-requisites. Please see course descriptions to determine if there are any pre-requisites for that specific course.

## Co-curricular and Experiential Learning

Students are encouraged to explore additional curricular and co-curricular opportunities. There is a strong correlation between long-term student success and participation in the following types of programs and activities:

1. High-Impact Practice (HIP) designated classes (Learning Community, Cap-Stone Course, Semester Projects)
2. Student-faculty research
3. Service Learning Courses
4. Internships
5. Volunteering (Summer Day Camps, Semester Workshops for K-12 students, Robot demos for visitors/local school districts)
6. Industry Awareness Night

## Important Curriculum Guide Notes

This Curriculum Guide is provided to help SRU students and prospective students better understand their intended major curriculum. Enrolled SRU students should note that the My Rock Audit may place already-earned and/or in progress courses in different, yet valid, curriculum categories. Enrolled SRU students should use the My Rock Audit Report and materials and information provided by their faculty advisers to ensure accurate progress towards degree completion. *The information on this guide is current as of the date listed. Students are responsible for curriculum requirements at the time of enrollment at the University.*

PASSHE - Pennsylvania State System of Higher Education Institutions

COMPUTING - BS (6420)

Concentration in Computing Analytics (COAN)

This program is effective as of Summer 2022

Revised 06.10.2022

UCC 03.01.2022

## Recommended Four-Year Plan

Course	Title	Hours
<b>First Year</b>		
<b>Fall</b>		
CPSC 130	Introduction to Computing and Programming	3
ENGL 102	Critical Writing	3
ESAP 101	FIRST Seminar *	1
MATH 120 or SCI 101	Intermediate Algebra or Science of Life	3
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3
Creative & Aesthetic Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<b>Hours</b>		<b>16</b>

<b>Spring</b>		
CPSC 146	Programming Principles	3
Select one of the following:		3-4
MATH 125	Precalculus	
MATH 225	Calculus I	
MATH 230	Calculus II	
MATH 231	Calculus III	
STAT 152	Elementary Statistics I	
ENGL 104	Critical Reading	3
Select one of the following:		3
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
Social Science Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<b>Hours</b>		<b>15-16</b>

### Second Year

<b>Fall</b>		
CPSC 207	Shell Commands and Scripting	3
CPSC 246	Advanced Programming Principles	3
STAT 152	Elementary Statistics I	3
SCI 101	Science of Life (or CA Elective)	3
Computer Analytics Electives or Free Electives (p. 3)		3
Declare a Thematic Thread <sup>2</sup>		
<b>Hours</b>		<b>15</b>

<b>Spring</b>		
CPSC 323	Fundamentals of Database Systems	3
CPSC 370	Computer Organization and Architecture	3
SCI 102	Understanding the Physical World	3
Humanities Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Computer Analytics Electives or Free Electives (p. 3)		3
<b>Hours</b>		<b>15</b>

### Third Year

<b>Fall</b>		
CPSC 311	Discrete Computational Structures	3
CPSC 300	Challenges of Computer Technology	3
CPSC 405	Data Mining and Data Analysis	3
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Computer Analytics Electives or Free Electives (p. 3)		3
<b>Hours</b>		<b>15</b>

<b>Spring</b>		
CPSC 327	Administration and Security	3
CPSC 374	Algorithms and Data Structures	3
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Computer Analytics Electives or Free Electives (p. 3)		3
Computer Analytics Electives or Free Electives (p. 3)		3
<b>Hours</b>		<b>15</b>

### Fourth Year

<b>Fall</b>		
CPSC 423	Computer Networks	3

CPSC 474	Advanced Architecture & Parallel Computing	3
CPSC 480	Topics in Computer Science: Machine Learning	3
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Computer Analytics Elective or Free Elective		3

**Hours 15**

<b>Spring</b>		
CPSC 485	Big Data Analytics	3
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Computer Analytics Electives or Free Electives (p. 3)		4
Computer Analytics Electives or Free Electives (p. 3)		3

**Hours 13**

**Total Hours\*\* 119-120**

<sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject.

<sup>2</sup> Work with your Academic Adviser to declare a Thematic Thread by the end of your fall semester in your second year.

\* Students are encouraged to take ESAP 101 as a Free Elective.

## Computer Analytics Elective Courses

Code	Title	Hours
Select six credits of the following:		
CPSC 406	Data Visualization	6
CPSC 450	Internship <sup>1</sup>	
CPSC 456	Introduction to Computer Graphics	
CPSC 476	Artificial Intelligence	
CPSC 478	Analysis of Algorithms	
MATH 225	Calculus I	

<sup>1</sup> Jr. or Sr. Computing major with 3.0 GPA. Application required.

<sup>2</sup> Work with your Academic Adviser to declare a Thematic Thread by the end of your fall semester in your second year.

**\*\* This document is meant to serve as a guide. Some planners may show more than 120 credits because faculty have created flexibility in choosing courses. However, only 120 credits are required to obtain a degree. Please consult with your academic adviser and refer to your curriculum guide prior to registering for courses. This plan should be reviewed, and verified, by you and your academic adviser at least once each academic year.**

Major Code: 6420

Concentration Code: COAN

Revised date: 06.10.2022