

**PROGRAM PLANNING REPORT  
SAN JOSE STATE UNIVERSITY**

**DEPARTMENT OF COMPUTER SCIENCE**

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSCS)**

**MASTER OF SCIENCE IN COMPUTER SCIENCE (MSCS)**

**MASTER OF SCIENCE IN BIOINFORMATICS (MSBI)**

**COLLEGE OF SCIENCE**

**<https://www.sjsu.edu/cs/>**

**Department Chair or School Director:** Melody Moh, MQH 208, [melody.moh@sjsu.edu](mailto:melody.moh@sjsu.edu), 408-924-5088

**Faculty Program Plan Leader:** Melody Moh

**External Accrediting Agency:** ABET for BSCS, ([www.abet.org](http://www.abet.org))

**Date of Report:** September, 2022

**Date Due to PPC:** September 15, 2022

**Committee Chair:** [Abraham Wolcott](#) (lead chair) and [Erin Woodhead](#) (co chair)

## Table of Contents

<b>1. PROGRAM DESCRIPTION</b>	<b>4</b>
1a. Program mission and goals	5
1b. Curricular Content of Degrees, Minors, Certificates, and Credentials	6
1c. Service Courses	7
<b>2. SUMMARY OF PROGRESS, CHANGES, AND PROPOSED ACTIONS</b>	<b>7</b>
2a. Progress on action plan of previous program review	7
2b. Significant changes to the program and context, if any	8
<b>3. ASSESSMENT OF STUDENT LEARNING</b>	<b>9</b>
3a. Program Learning Objectives (PLO)	9
3b. Map of PLOs to University Learning Goals (ULG)	12
3c. Matrix of PLOs to Courses	19
3d. Assessment Data	31
3e. Assessment Results and Interpretation	35
3f. Placement of Grads	46
<b>4. PROGRAM METRICS AND REQUIRED DATA</b>	<b>49</b>
4a. Enrollment Rates	49
4b. Retention and Graduation Rates	50
4c. Headcount in sections	55

4d. FTES, Induced Course Load Matrix (ICLM)	55
4e. FTEF	57
4f. SFR	57
4g. Percentage T/TT Faculty	58
<b>5. PROGRAM RESOURCES</b>	<b>58</b>
5a. Faculty number and qualifications	58
5b. Support staff	64
5c. Facilities	64
<b>6. OTHER STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND CHALLENGES</b>	<b>67</b>
<b>7. ASSESSMENT OF STUDENT LEARNING IN GE COURSES (IF APPLICABLE)</b>	<b>68</b>
7.1 GE Summary and Reflection	68
7.2 Interpretation of Assessment Results and Subsequent Actions	68
<b>8. DEPARTMENT ACTION PLAN</b>	<b>699</b>
<b>9. APPENDICES</b>	<b>70</b>
A. Details of the BSDS Program and its Self-conducted Student Interest Survey	70
B. Graduation Rates	78
C. Headcounts	82
D. ICLM (Induced Course Load Matrix)	83
E. SFR (Student to Faculty Ratio)	93
F. GE Assessment	99



# 1. PROGRAM DESCRIPTION

- The Computer Science Department has four-degree programs: the BS in Computer Science (BSCS) program; the MS in Computer Science (MSCS) program; and the MS in Bioinformatics program (MSBI), and a newly added Bachelor of Science in Data Science (BSDS). The Department also offers the MS in Data Science (MSDS) with the Dept. of Mathematics and Statistics with the MSDS program housed at the College of Science.. In addition, the Department offers a minor in Computer Science, and supports and shares the curriculum governance of the BS in Software Engineering (BSSE) program with the Computer Engineering Department.
- The Bachelor of Science in Computer Science (BSCS) degree was first offered by the Mathematics and Computer Science Department in the 1986-87 academic year. The Department of Mathematics and Computer Science split into two departments in 2001. The BSCS program is accredited by ABET (Accreditation Board for Engineering and Technology, [abet.org](http://abet.org)); the next ABET accreditation report is due in Fall 2023.

The Master of Science in Computer Science (MSCS) was first offered in 1978.

The Master of Science in Bioinformatics (MSBI) was first offered in 2018.

The Master of Science in Data Science (MSDS, co-offered with the Dept. of Math/Stat) was first offered in 2020.

The Bachelor of Science in Data Science (BSDS), approved by the CSU Chancellor's Office in summer of 2022, will be first offered in Spring 2023.

The department office is located in MacQuarrie Hall 208. The department's web site is located at:

<http://www.sjsu.edu/cs>

## 1a. Program mission and goals

### **Mission Statement for the Department of Computer Science**

*Providing computer science-focused education and preparing graduates for the academic and industry fields of computer science, data science, and bioinformatics, as well as developing additional computing pathways - both traditional and interdisciplinary - and allowing a diverse study body to access a wide variety of computing-intensive fields.*

### **Mission statement for BSCS Program:**

*To enable the graduates of the program to function as software engineers or to further their education in graduate school.*

### **Mission statement for MSCS Program:**

*To build upon the students' undergraduate foundations in computer science and to advance their knowledge in the field*

**Mission statement for MSBI Program:**

*To prepare students for careers in the growing field of bioinformatics both in academia and in the biotechnology industry.*

**Mission statement for BSDS Program:**

*To provide computing-focused, interdisciplinary in nature data science education, addressing the vast shortage of data scientists in the job market, and the critical need of an affordable BS in Data Science degree program locally that can serve minority and low-income students, thereby improving diversity in the technology workforce.*

**1b. Curricular Content of Degrees, Minors, Certificates, and Credentials**

Every program offered in the CS Department addresses the technology workforce needs in the areas of computer science, data science, and bioinformatics (i.e., data analytics in biomedical applications). We continue to develop degree programs that address the evolving needs of Silicon Valley. In addition, our newest degree program, BSDS, has been designed to be interdisciplinary in nature to attract a wider audience and to improve technology workforce diversity.

**Programs**

**Undergraduate Major(s)**

- Computer Science, BS - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7663](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7663)
- Data Science, BS - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=8134](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=8134)

**Undergraduate Minor(s)**

- Computer Science Minor - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7662](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7662)

**Master(s)**

- Bioinformatics, MS - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7595](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7595)
- Computer Science, MS - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7664](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7664)
- Data Science, MS - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7971](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7971)

**Certificate(s)**

Two types of certificates are available: Advanced Certificates (University Requirements could be found here: <https://catalog.sjsu.edu/content.php?catoid=13&navoid=4993>) and Basic Certificates (University Requirements could be found here: <https://catalog.sjsu.edu/content.php?catoid=13&navoid=4992>). The description of each certificate program identifies the type of certificate.

- Cybersecurity: Core Technologies Certificate - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7671](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7671)
- Fundamentals of Cybersecurity Certificate - [https://catalog.sjsu.edu/preview\\_program.php?catoid=13&poid=7726](https://catalog.sjsu.edu/preview_program.php?catoid=13&poid=7726)

Added Authorization(s)

Not applicable.

**1c. Service Courses**

**CS 22A** entitled Python for Everyone. It is GE Area B4 Mathematical Concepts (beginning Fall 2022)

The course, CS 22A - Python for Everyone, aims to provide students in non-computing majors with the opportunity to learn and apply computer programming to solve real-world problems, exposing them to high-demand skills. Students who are not in computer science majors or minors or software engineering majors can take this course. It will start from Fall 2022. Students learn computer programming and mathematical concepts from the same course. We believe it to be a strong benefit to the students opting to take this course. CS 22A is also a required course for the Bioinformatics minor program.

**CS 100W** entitled Technical Writing Workshop. It is GE Area Z.

CS 100W (technical Writing Workshop) is advanced writing through preparation of technical reports and presentations. It targets in improving skills for writing subject-related reports, project proposals and personal resumes through practice and evaluation. Its assignments are related to issues concerning careers in computer science.

## 2. SUMMARY OF PROGRESS, CHANGES, AND PROPOSED ACTIONS

**2a. Progress on action plan of previous program review**

Action Item	Action taken	Status update
Revise the MS program learning outcomes to reflect measurable skills and identify criteria for evaluating these outcomes. To be completed by November 1, 2015.	The department worked with Melinda Jackson to revise the MS program learning outcomes to reflect measurable skills and identify criteria for evaluating these outcomes	Completed

Make all the course syllabi conform to the required accessible syllabus template	The department worked with all the faculty to make all course syllabi conform to the required accessible syllabus template.	Completed
Turn in the Program Review for CS 100 W to BOGS by November 1, 2015 to ensure that the course maintain its GE certification	The department turned in the Program Review for CS 100 W to BOGS by and ensured that the GE certification of the course is maintained.	Completed
Determine if the department will continue the recertification of the UNIX Certificate no later than November 1, 2015	The department has decided to discontinue the recertification of the UNIX Certificate.	Completed.
The next program review has been extended from Fall 2021 (originally shown on the Program Planning calendar) to Fall 2022 to align with the ABET accreditation review scheduled in Fall 2023.		

**2b. Significant changes to the program and context**

The Department of Computer Science has made the following changes since last Program Planning (Fall 2014):

1. New MS program: MS in Bioinformatics (started Spring 2018).
2. New MS program: MS in Data Science (started Fall 2020, jointly with the Dept. of Mathematics and Statistics).
3. New BS program: BS in Data Science (to officially start in Spring 2023).
4. Significant focus on DEI (Diversity, Equity, and Inclusiveness).
5. New Collaboration for CS Education (K-12)

**New Data Science Degree Programs**

As can be seen, the new programs are all centered around data science and analysis (bioinformatics is data analysis of biomedical data). This is mainly due to the following factors (detailed factors have been provided in the full proposal of the latest new degree program: BSDS, these details are included in [Appendix 9A](#)):

- Market demand for data scientists.
- Lack of rigorous data science programs in universities.
- Lack of affordable data science degree programs provided locally.



- Data science increases the diversity, equity, and inclusiveness in STEM degree programs and workforce.
- Student demand.

### **Significant DEI Focus**

The CS Department has focused on DEI (Diversity, Equity, and Inclusiveness) values. The Department received an Implementation Grant, awarded (subcontracted) by the Center for Inclusive Computing, Northeastern University (PI: Melody Moh, Co-PI: Elaine Collins, Wendy Lee, and Rula Khayrallah), in the amount of \$800,000, for two years (Oct 2021 – Sept 2023), for increasing the number of women and minority undergraduate students in computing. With its support, we proposed the interdisciplinary BSDS program intended to address the critical need of an affordable BS in Data Science degree program in the Bay Area that can serve minority and low-income students. We organized our first annual DEI retreat for faculty and staff in March 2022, attended by over 75 % of T/TT faculty members and a significant number of lecturers. We also hired a full-time Academic Advisor to help increase recruitment, retention, graduation, and career-success rates for women and minority BS students.

### **Collaboration for CS Education (K-12)**

The CS Department co-hired a tenure-track faculty member with the Science Education Program in Fall 2021, and has collaborated with the College of Education, Science Education Program, and SJSU STEM Director to co-develop a CS Supplemental Authorization program for training K-12 CS teachers. We also received recently a \$2 million NSF CS for All grant for scaling CS Supplementary Authorization program, received jointly with three other norCal CSUs in Sept 2022 to scale the CS Supplementary Authorization programs at these northern California CSU campuses.

## **3. ASSESSMENT OF STUDENT LEARNING**

### **3a. Program Learning Objectives (PLO)**

#### **BSCS**

**The PLOs were changed according to ABET's new requirements.** ABET's latest requirements can be found at: <https://www.abet.org/wp-content/uploads/2021/01/C001-21-22-CAC-Criteria.pdf>

These revised PLOs were formulated and discussed majorly with the Assessment committee, Assessment Coordinator Prof. Thomas Austin, and BSCS coordinator Ms. Rula Khayrallah. The PLOs were then discussed with the faculty members, voted on and approved by the department in 2020.

**Program Learning Objectives (PLO) of BSCS (NEW; 2021 ~ 2024)**

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

**Program Learning Objectives (PLO) of BSCS (OLD 2014~2019)**

- a) an ability to apply knowledge of computing and mathematics to solve problems
- b) an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c) an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- d) an ability to function effectively on teams to accomplish a common goal
- e) an understanding of professional, ethical, legal, security and social issues and responsibilities
- f) an ability to communicate effectively with a range of audiences
- g) an ability to analyze the local and global impact of computing on individuals, organizations, and society
- h) recognition of the need for and an ability to engage in continuing professional development
- i) an ability to use current techniques, skills, and tools necessary for computing practice
- j) an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices

k) an ability to apply design and development principles in the construction of software systems of varying complexity

Based on the differences between the new and old sets of PLOs, we dropped from the old set of PLOs (b), (g), (h), (i), and (k) and stopped assessing those items in our courses. The remaining PLOs were renamed to fit ABET's numbering scheme, with slight revisions to the text of the PLOs.

For our remaining PLOs (new PLO 1-6, using ABET's new numbering scheme) the text of all old rubrics was modified to match the outcome. No other changes were made to the rubrics.

Furthermore in order to align to the new ABET requirements, we made the following changes to the BSCS degree program:

- 1) Made CS 166 (information security) a required class, and added "exposure to networking" to the course description.
- 2) Made CS 157a (introduction to database management systems) a required class, and added "distributed processing in NoSQL systems" to the course description.
- 3) Added "parallel computing" to the "CS149 course description"
- 4) To make room for the new required classes, we dropped the "deep course" requirement and reduced the number of CS electives from 17 units to 14 units.

## MSCS

Since the PLOs didn't change, hence there are no old PLOs to report.

### **Program Learning Objectives (PLO) of MSCS**

Upon graduation an MSCS student should have acquired:

- a) Breadth of knowledge in computer science with course work in at least three of the subject areas Foundations, Architecture, Systems Software, Software Engineering Specialty.
- b) Depth of knowledge in an advanced topic in computer science, including the ability to carry out original work that builds upon the existing body of knowledge in the field.
- c) Ability to communicate effectively both orally and in writing Computer Science topics to researchers, practitioners, and the public.

**The PLOs were formulated and discussed majorly with the Assessment committee, Prof. Thomas Austin, and Ms. Rula Khayrallah. The PLOs were then discussed with the faculty members, voted on and approved by the department.**

## **MSBI**

Since the PLOs didn't change, hence there are no old PLOs to report.

### **Program Learning Objectives (PLO) of MSBI**

- a) PLO1 Students will demonstrate effective scientific written communication skills.
- b) PLO2 Students will demonstrate effective scientific oral communication skills.
- c) PLO3 Students will demonstrate the ability to independently answer complex biological questions using computational methods.
- d) PLO4 Students will demonstrate the ability to develop a research plan using information gained through critical analysis of primary literature.

The PLOs were originally formulated by Len Wesley, then revised by Phillip Heller in 2020, then approved by the Bioinformatics Course Committee.

## **BSDS**

BSDS is a newly introduced program offered by the CS department in fall 2022 for the first time. Its PLOs are:

Upon successful completion of the BS Data Science program, students will be able to

- PLO 1** Analyze a complex problem involving large datasets and apply principles of computing and other relevant disciplines to identify solutions.
- PLO 2** Design, implement, and evaluate a computing-based solution to meet a given set of requirements for processing and analyzing large data sets.
- PLO 3** Communicate effectively in a variety of professional contexts.
- PLO 4** Recognize professional responsibilities and make informed judgments in data science practice based on legal and ethical principles.
- PLO 5** Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- PLO 6** Apply theory, software development fundamentals, and tools throughout the data lifecycle and employ the resulting knowledge and skills to produce data-driven solutions.

### **3b. Map of PLOs to University Learning Goals (ULG)**

#### **BSCS PLOs mapping to ULG (Current)**



<b>University Learning Goals</b>	<b>Program Learning Outcomes</b>					
<b>Goals</b>	<b>PLO 1 - Apply computing and math knowledge. Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.</b>	<b>PLO 2 - Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.</b>	<b>PLO 3 - Communicate effectively in a variety of professional contexts.</b>	<b>PLO 4 - Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.</b>	<b>PLO 5 - Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.</b>	<b>PLO 6 - Apply computer science theory and software development fundamentals to produce computing-based solutions.</b>
<b>ULG 1 - Social and Global Responsibilities</b>				✓		
<b>ULG 2 - Specialized Knowledge</b>	✓	✓				✓
<b>ULG 3 - Intellectual Skills</b>			✓			

ULG 4 - Integrative Knowledge and Skills				✓		✓
ULG 5 - Applied Knowledge and Skills	✓	✓			✓	✓

**BSCS PLOs mapping to ULG (Old) - BSCS Program Learning Outcomes (2019) – Used for this assessment period**

BSCS Program Educational Objectives	BSCS Program Learning Outcomes (2019)										
	a	b	c	d	e	f	g	h	i	j	k
1. Be making progress in their chosen career or advanced educational program.	X	X	X	X		X			X	X	X
2. Be contributing to their chosen profession.					X		X	X			
3. Be growing in their professional abilities through self-study and course work.								X			
<b>University Learning Goals</b>											
1. Specialized Knowledge	X	X	X						X	X	X
2. Broad Integrative Knowledge					X				X	X	X

<b>3. Intellectual Skills</b>							X		X			
<b>4. Applied Knowledge</b>	X	X	X	X						X	X	X
<b>5. Social and Global Responsibilities</b>					X		X					

**MSCS PLOs mapping to ULG**

University Learning Goals	Program Learning Outcomes		
Goals	PLO (a) Breadth of knowledge in computer science with course work in at least three of the subject areas Foundations, Architecture, Systems Software, Software Engineering Specialty	PLO (b) Depth of knowledge in an advanced topic in computer science, including the ability to carry out original work that builds upon the existing body of knowledge in the field	PLO (c) Ability to communicate effectively both orally and in writing Computer Science topics to researchers, practitioners, and the public
<b>ULG 1 - Social and Global Responsibilities</b>			✓
<b>ULG 2 - Specialized Knowledge</b>		✓	
<b>ULG 3 - Intellectual Skills</b>		✓	
<b>ULG 4 - Integrative Knowledge and Skills</b>	✓		

<b>ULG 5 - Applied Knowledge and Skills</b>	✓		✓
---	---	--	---

MSBI PLOs mapping to ULG

<b>University Learning Goals</b>	<b>Program Learning Outcomes</b>			
<b>Goals</b>	<b>PLO1 Students will demonstrate effective scientific written communication skills</b>	<b>PLO2 Students will demonstrate effective scientific oral communication skills</b>	<b>PLO3 Students will demonstrate the ability to independently answer complex biological questions using computational methods</b>	<b>PLO4 Students will demonstrate the ability to develop a research plan using information gained through critical analysis of primary literature.</b>
<b>ULG 1 - Social and Global Responsibilities</b>				
<b>ULG 2 - Specialized Knowledge</b>			✓	
<b>ULG 3 - Intellectual Skills</b>	✓	✓	✓	✓
<b>ULG 4 -</b>				✓



<b>Integrative Knowledge and Skills</b>				
<b>ULG 5 - Applied Knowledge and Skills</b>			✓	✓

**BSDS PLOs mapping to ULG**

<b>University Learning Goals</b>	<b>Program Learning Outcomes</b>
----------------------------------	----------------------------------

Goals	<p><b>PLO 1:</b> Analyze a complex problem involving large datasets and apply principles of computing and other relevant disciplines to identify solutions.</p>	<p><b>PLO 2:</b> Design, implement, and evaluate a computing-based solution to meet a given set of requirements for processing and analyzing large data sets.</p>	<p><b>PLO 3:</b> Communicate effectively in a variety of professional contexts.</p>	<p><b>PLO 4:</b> Recognize professional responsibilities and make informed judgments in data science practice based on legal and ethical principles.</p>	<p><b>PLO 5:</b> Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.</p>	<p><b>PLO 6:</b> Apply theory, software development fundamentals, and tools throughout the data lifecycle and employ the resulting knowledge and skills to produce data-driven solutions.</p>
<p><b>ULG 1 Social and Global Responsibilities.</b></p>				<p>✓</p>		

ULG 2 Specialized Knowledge.	✓	✓	✓		✓	✓
ULG 3 Intellectual Skills.	✓	✓	✓	✓	✓	✓
ULG 4 Integrative Knowledge and Skills.	✓	✓	✓		✓	✓
ULG 5 Applied Knowledge.	✓	✓			✓	✓

**3c. Matrix of PLOs to Courses**

**BSCS Course Mappings**

<i>Program -</i>	<i>Courses 1 - Introduced, 2 - Reinforced, 3 - Assessed</i>
------------------	---

<b>Computer Science (BS)</b>												
<b>Program Learning Outcomes</b>	<b>CS 46A - Introduction to Programming*</b>	<b>CS 46B - Introduction to Data Structures*</b>	<b>CS 47 - Introduction to Computer Systems*</b>	<b>CS 146 - Data Structures and Algorithms*</b>	<b>CS 147 - Computer Architecture*</b>	<b>CS 149 - Operating Systems*</b>	<b>CS 151 - Object-Oriented Design*</b>	<b>CS 152 - Programming Paradigms*</b>	<b>CS 154 - Formal Languages and Computability*</b>	<b>CS 160 - Software Engineering*</b>	<b>CS 100W - Technical Writing Workshop*</b>	<b>PHIL 134 - Computers, Ethics and Society</b>
<b>PLO 1 - Apply computing and math knowledge . Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.</b>	✓ 1	✓ 1	✓ 1	✓ 3	✓ 2	✓ 2	✓ 2	✓ 2	✓ 3	✓ 3		

<p>PLO 2 - Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.</p>	✓ 1	✓ 1	✓ 1	✓ 2	✓ 2	✓ 2	✓ 3	✓ 3		✓ 3		
<p>PLO 3 - Communicate effectively in a variety of professional contexts.</p>										✓ 3	✓ 3	
<p>PLO 4 - Recognize professional responsibilities</p>												✓ 3

ties and make informed judgments in computing practice based on legal and ethical principles.												
PLO 5 - Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.						✓ 3				✓ 3	✓ 2	
PLO 6 - Apply computer science theory and software	✓ 1	✓ 1		✓ 2		✓ 2	✓ 3	✓ 3		✓ 3		

development fundamentals to produce computing-based solutions.													
--	--	--	--	--	--	--	--	--	--	--	--	--	--

**MSCS Course Mappings**

Program - Computer Science (MS)	<i>Courses 1 - Introduced, 2 - Reinforced, 3 - Assessed</i>	
Program Learning Outcome	CS 200W - Graduate Technical Writing*	CS 298 - Master's Writing Project*
PLO (a) Breadth of knowledge in computer science with course work in at least three of the subject areas Foundations, Architecture, Systems Software, Software Engineering Specialty		✓ 1 2 3
PLO (b) Depth of knowledge in an advanced topic in computer science, including the ability to carry out original work that builds upon the existing body of knowledge in the field		✓ 1 2 3

PLO (c) Ability to communicate effectively both orally and in writing Computer Science topics to researchers, practitioners, and the public	✓ 1 2 3	
---	------------	--

MSBI Course Mappings

<i>Program - Bioinformatics (MS)</i>	<i>Courses 1 - Introduced, 2 - Reinforced, 3 - Assessed</i>								
Program Learning Outcomes	200 W - Graduate Technical Writing*	BIOL 123A - Bioinformatics I*	CS 123A - Bioinformatics I*	CS 123B - Bioinformatics II*	BIOL 123B - Bioinformatics II*	CS 223 - Bioinformatics*	BIOL 298 - MS project Culminating Experience*	CS 280 - Graduate Individual Studies*	MATH 298 - Master's Thesis*
PLO1 Students will demonstrate effective scientific written communication skills	✓ 1			✓ 2	✓ 2	✓ 2	✓ 3	✓ 3	✓ 3
PLO2 Students will demonstrate effective	✓ 1					✓ 2	✓ 3	✓ 3	✓ 3



scientific oral communication skills									
PLO3 Students will demonstrate the ability to independently answer complex biological questions using computational methods		✓ 1	✓ 1	✓ 2	✓ 2	✓ 2	✓ 3	✓ 3	✓ 3
PLO4 Students will demonstrate the ability to develop a research plan using information gained through critical analysis of primary literature.	✓ 1					✓ 2	✓ 3	✓ 3	✓ 3

**BSDS PLOs to SLOs Mappings**

Program Learning Outcomes	Student Learning Outcomes (SLOs)					
SLOs	SLO 1: Apply mathematical and programming knowledge to build data-driven models and solutions.	SLO 2: Design, implement, and utilize algorithms and software tools to effectively process, manage, and analyze data.	SLO 3: Describe and implement data-analysis concepts, models, and solutions based on machine-learning and artificial-intelligence techniques.	SLO 4: Explain and summarize results and report findings in oral and written forms.	SLO 5: Function effectively on a team to accomplish a common goal in providing a data-driven solution.	SLO 6: Recognize professional responsibilities and make informed judgments in data science practice based on legal and ethical principles.

<p><b>PLO 1: Analyze a complex problem involving large datasets and apply principles of computing and other relevant disciplines to identify solutions.</b></p>	✓	✓				
<p><b>PLO 2: Design, implement, and evaluate a computing-based solution to meet a given set of requirements for processing and analyzing large data sets.</b></p>	✓	✓	✓			

<p>PLO 3: Communicate effectively in a variety of professional contexts.</p>				✓		
<p>PLO 4: Recognize professional responsibilities and make informed judgments in data science practice based on legal and ethical principles.</p>						✓

<p><b>PLO 5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.</b></p>					✓	
<p><b>PLO 6: Apply theory, software development fundamentals, and tools throughout the data lifecycle and employ the resulting knowledge and skills to produce data-driven solutions.</b></p>	✓	✓	✓	✓		✓

**BSDS Matrix of curriculum contributions to SLOs (I: Introduced level, D: Developed level, and M: Mastered level)**

Catalog #	Title	SLO					
		1	2	3	4	5	6
CS 22A	Python for Everyone	I					
CS 46B	Introduction to Data Structures	D					
CS 100W	Technical Writing Workshop				I		
CS 131	Processing Big Data - Tools and Techniques	D	D	I			
CS 133	Introduction to Data Visualization		D	I	D	I	
CS 146	Data Structures and Algorithms	D	I	D			
CS 156	Introduction to Artificial Intelligence		D	M			
CS 157A	Introduction to Database Management Systems		M			I	

<b>CS 163</b>	Data Science Senior Project	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>D</b>
<b>CS 166</b>	Information Security					<b>D</b>	<b>D</b>
<b>CS 171</b>	Introduction to Machine Learning	<b>M</b>	<b>D</b>	<b>M</b>			
<b>PHIL 133</b>	Ethics and Science						<b>I</b>
<b>MATH 161A</b>	Applied Probability and Statistics I	<b>D</b>					

**3d. Assessment Data**

**BSCS:** The BSCS is assessed over a 2-year cycle, detailed at <https://www.sjsu.edu/cs/about-us/assessment/assessment-schedule.php>. The schedule is as follows:

- PLO 1 is assessed in CS 146 (Data Structures and Algorithms) during the Spring semester of even years (Spring 22, 24, etc.).
- PLO 2 is assessed in CS 151 (Object-Oriented Design) during the Fall semester of even years (Fall 22, 24, etc.).
- PLO 3 is assessed in CS 100W (Technical Writing Workshop) during the Spring semester of odd years (Spring 21, 23, etc.).
- PLO 4 is assessed in CS PHIL 134 (Computers, Ethics and Society) during the Spring semester of odd years (Spring 21, 23, etc.).
- PLO 5 is assessed in CS 151 (Object-Oriented Design) during the Fall semester of even years (Fall 22, 24, etc.).
- PLO 6 is assessed in CS 160 (Software Engineering) during the Fall semester of odd years (Fall 21, 23, etc.).

**For the assessed class, every student in every section is assessed for the given PLO.**

**MSCS:** The MSCS program is accessed annually and is required to submit periodic assessment reports to the university in March each year in support of WASC re-accreditation. For details, see: <http://www.sjsu.edu/wasc/Objectives and Outcomes>.

**The Program Learning Outcomes (PLOs) are listed below. Upon graduation an MSCS student should have acquired:**

- a) Breadth of knowledge in computer science with course work in at least three of the subject areas Foundations, Architecture, and Systems Software.
- b) Depth of knowledge in an advanced topic in computer science, including the ability to carry out original work that builds upon the existing body of knowledge in the field.
- c) Ability to communicate effectively both orally and in writing Computer Science topics to researchers, practitioners, and the public.

To measure the extent to which MSCS graduates achieved program outcomes Writing Project or Thesis, committee members are asked to complete a survey at the end of the defense. There are two survey forms used for the assessment.

- a) The first survey form asks committee members if the thesis (or writing project) demonstrated good depth of knowledge, PLO (b), and good technical communication skills, PLO (c), both written and oral. The response can be Excellent, Satisfactory, or Below. Additional space is provided for comments.
- b) The second survey form asked MSCS graduate students if the thesis (or writing project) demonstrated good depth of knowledge, PLO (b), and good technical communication skills, PLO (c), both written and oral. The response can be Not Applicable, Strongly Disagree, Disagree, Agree, or Strongly Agree. Additional space is provided for comments.

PLO (a) is assumed to be achieved by the structure of the program. Namely, students are required to take three subject areas: Foundations, Architecture, and Systems Software.

Faculty participating in the assessment are Melody Moh ([melody.moh@sjsu.edu](mailto:melody.moh@sjsu.edu)), Chris Pollett ([chris.pollett@sjsu.edu](mailto:chris.pollett@sjsu.edu)), Mike Wu ([ching-she.wu@sjsu.edu](mailto:ching-she.wu@sjsu.edu)).

**MSBI:** In every cycle, every MSBI student was assessed against every scheduled PLO in every assessed course. All faculty of all assessed courses participated. Around early March, instructors were provided with a standard rubric for each PLO and asked to complete one rubric for each MSBI student. Instructors also specified the grading instrument on which assessment was based. While this varies for most courses, in CS 298 the instrument for PLOs 1, 3, and 4 was the student's final report, and the instrument for PLO 2 was the student's defense presentation. There was no indirect assessment.



**BSDS:** Our BSDS program has just started in Fall 2022. A **Comprehensive Assessment Plan** for it is tabulated below:

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>
<i>ULGs</i>	<i>PLOs</i>	<i>SLOs</i>	<i>Course where each SLO is assessed</i>	<i>Assessment activity/ assignment used to measure each SLO</i>	<i>Assessment tool used to measure outcome success</i>	<i>Assessment schedule – how often SLOs will be assessed</i>	<i>How data/ findings will be quantitatively or qualitatively reported</i>	<i>Designated personnel to collect, analyze, and interpret student learning outcome data</i>	<i>Program data/findings dissemination schedule</i>	<i>Closing the loop strategies</i>
<i>2,3</i>	<i>1,2</i>	<i>1</i>	<i>CS 22A</i>	<i>Written assignment and exam</i>	<i>Analysis rubric</i>	<i>Every 2 years</i>	<i>Report on the percentage of</i>	<i>Instructors, Program Curriculum Committee</i>	<i>Every 2 years</i>	<i>Finding reported in a biannual assessment report</i>
<i>2,3</i>	<i>1,2</i>	<i>1</i>	<i>CS 46A</i>	<i>Written assignment and exam</i>	<i>Analysis rubric</i>	<i>Every 2 years</i>	<i>students that meet or</i>		<i>Every 2 years</i>	<i>report submitted</i>

2,3, 4	3	4	CS 100W	Written Report	Analysis rubric	Every 2 years	exceed a minimum level established for each SLO based on all rubric criteria	Members, and Program Director.	Every 2 years	ed to SJSU.
2,3, 5	2,3, 6	3,4	CS 133	Written assignment and exam	Analysis rubric	Every 2 years			Every 2 years	
2,3	1, 2	1, 3	CS 146	Written assignment and exam	Analysis rubric	Every 2 years			Every 2 years	
2,3	1, 2	2	CS 157A	Written assignment and exam	Analysis rubric	Every 2 years			Every 2 years	
5	5	5	CS 166	Written assignment and exam	Analysis rubric	Every 2 years			Every 2 years	
2,3, 4, 5	1,2, 6	1, 3	CS 171	Written assignm	Report rubric	Every 2 years			Every 2 years	

				<i>ent and exam</i>					
<i>1,4,5</i>	<i>4</i>	<i>6</i>	<i>PHIL 134</i>	<i>Written assignment and exam</i>	<i>Analysis rubric</i>	<i>Every 2 years</i>			<i>Every 2 years</i>

**3e. Assessment Results and Interpretation**

**BSCS**

**Summary of Evaluation Criteria**

<b>PLO</b>	<b>Evaluation Criteria/Goals</b>
<b>1</b>	<b>Assessment Method: Direct – course embedded exam/quiz</b> <b>Reporting Period: 2020 (Jan-Dec)</b> <b>70% of our students achieved “exemplary” or “satisfactory” on all performance indicators.</b>
<b>2</b>	<b>Assessment Method: Direct – course embedded exam/quiz</b> <b>Reporting Period: 2020 (Jan-Dec)</b> <b>70% of our students achieved “exemplary” or “satisfactory” on all performance indicators.</b>
	<b>Assessment Method: Direct – course embedded work</b> <b>Reporting Period: 2019 (Jan-Dec)</b>

	70% of our students achieved “exemplary” or “satisfactory”.
3	<p>Assessment Method: Direct – course embedded work</p> <p>Reporting Period: 2021 (Jan-Dec)</p> <p>86% to 99% of our students achieved “exemplary” or “satisfactory” on all performance indicators.</p>
	<p>Assessment Method: Direct – course embedded exam/quiz</p> <p>Reporting Period: 2019 (Jan-Dec)</p> <p>90% of our students achieved “exemplary” or “satisfactory” in all areas.</p>
4	<p>Assessment Method: Direct – course embedded work</p> <p>Reporting Period: 2021 (Jan-Dec)</p> <p>More than 90% of our students achieved “exemplary” or “satisfactory” on all performance indicators.</p>
5	<p>Assessment Method: Direct – course embedded work</p> <p>Reporting Period: 2020 (Jan-Dec)</p> <p>70% of our students achieved “satisfactory” or above on all performance indicators.</p>
6	<p>Assessment Method: Direct – course embedded work</p> <p>Reporting Period: 2019 (Jan-Dec)</p> <p>97% of our students achieved “exemplary” or “satisfactory” results.</p>
	Assessment Method: Direct – course embedded work

	<p><b>Reporting Period: 2021 (Jan-Dec)</b></p> <p><b>Overwhelming majority of 97.8% of our students achieved “satisfactory” or above on all performance indicators.</b></p>
--	---

**MSCS**

**Summary of Evaluation Criteria**

<b>PLO</b>	<b>Evaluation Criteria/Goals</b>																														
<b>(a)</b>	<p><b>PLO (a): Reporting period: 2021, 2020 (Jan-Dec).</b></p> <p>Assessments were conducted via student survey. The following results are the sum of students who selected “Strongly Agree and Agree”. There were 12 questions in all. Question 8 ~ 12 were short answer questions and question 11 was optional. Question 1 was to know in which semester they plan to graduate. Question 2~6 relates to PLO (a), their details given in the table below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Q2</th> <th colspan="2">Q3</th> <th colspan="2">Q4</th> <th colspan="2">Q5</th> <th colspan="2">Q6</th> </tr> <tr> <th>2020</th> <th>2021</th> <th>2020</th> <th>2021</th> <th>2020</th> <th>2021</th> <th>2020</th> <th>2021</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">54%</td> <td style="text-align: center;">88%</td> <td style="text-align: center;">66%</td> <td style="text-align: center;">93%</td> <td style="text-align: center;">79%</td> <td style="text-align: center;">82%</td> <td style="text-align: center;">74%</td> <td style="text-align: center;">90%</td> <td style="text-align: center;">77%</td> <td style="text-align: center;">78%</td> </tr> </tbody> </table> <p>The assessment results were within expected range and much improved comparing with the assessment results from the last two years.</p>	Q2		Q3		Q4		Q5		Q6		2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	54%	88%	66%	93%	79%	82%	74%	90%	77%	78%
Q2		Q3		Q4		Q5		Q6																							
2020	2021	2020	2021	2020	2021	2020	2021	2020	2021																						
54%	88%	66%	93%	79%	82%	74%	90%	77%	78%																						
<b>(b)</b>	<p><b>PLO (b): Reporting period: 2021, 2020 (Jan-Dec).</b></p> <p>PLO (b) was assessed using a Written Project/Thesis Evaluation form in accordance with 1-year assessment plan for 2021; and 2-year assessment plan for 2020. 31/31 forms of Depth of Knowledge were collected for 2021 and 48/48 forms were collected for 2020. The results for both the years are shown below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5">Depth of Knowledge</th> </tr> <tr> <th></th> <th>Excellent</th> <th>Satisfactory</th> <th>Below</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td style="width: 20px; height: 20px;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Depth of Knowledge						Excellent	Satisfactory	Below	Total																				
Depth of Knowledge																															
	Excellent	Satisfactory	Below	Total																											

		<b>2020</b>	<b>75%</b>	<b>25%</b>	<b>0%</b>	<b>100%</b>				
		<b>2021</b>	<b>90%</b>	<b>10%</b>	<b>0%</b>	<b>100%</b>				
	The assessment results were within expected range and much improved comparing with the assessment results from the last two years									
<b>(c)</b>	<b>Reporting period:</b> 2021, 2020 (Jan-Dec).									
	PLO (c) was assessed using a Written Project/Thesis Evaluation form in accordance with 1-year assessment plan for 2021; and 2-year assessment plan for 2020. 31/31 forms of Written and Oral Communication each were collected for 2021 and 48/48 similar forms were collected for 2020. The results are shown below for both the years.									
		<b>Written</b>					<b>Oral</b>			
		<b>Excellent</b>	<b>Satisfactory</b>	<b>Below</b>	<b>Total</b>		<b>Excellent</b>	<b>Satisfactory</b>	<b>Below</b>	<b>Total</b>
	<b>2020</b>	<b>81%</b>	<b>19%</b>	<b>0%</b>	<b>100%</b>		<b>77%</b>	<b>23%</b>	<b>0%</b>	<b>100%</b>
	<b>2021</b>	<b>90%</b>	<b>10%</b>	<b>0%</b>	<b>100%</b>		<b>93%</b>	<b>7%</b>	<b>0%</b>	<b>100%</b>
	The assessment results were within expected range and much improved comparing with the assessment results from the last two years									

**MSBI**

**Summary of Evaluation Criteria**

<b>PLO</b>	<b>Evaluation Criteria/Goals</b>
	<b>Reporting Period: 2020 (Jan-Dec)</b>

1	<p>Direct – Course Embedded Work – 67% of the students achieved the objective for the INTRODUCED course; 80% achieved for the REINFORCED courses; 100% achieved it for the MASTERED courses.</p>
	<p>Reporting Period: 2020 (Jan-Dec)</p> <p>Direct – Culminating Experience – 100% of our students achieve the goal. However, since only 3 students are assessed, the sample is too small for analysis.</p>
2	<p>Reporting Period: 2020 (Jan-Dec)</p> <p>Direct – Oral Presentation – 100% success rate since all of our students achieve the goal. However, since only 5 students are assessed, the sample is too small for statistical conclusions.</p>
	<p>Reporting Period: 2020 (Jan-Dec)</p> <p>Direct – Culminating Experience – One student failed to meet the objective. The small sample size skews the effect of this single failure. However, even one failure is cause for concern, and we have an action item to follow up on this student. Number of students assessed: 3</p>
3	<p>Reporting Period: 2021 (Jan-Dec)</p> <p>Direct – Course Embedded Work – 87% of assessments achieved the PLO. Three students didn't achieve at the Reinforced level. One of this has left the program. The other two successfully defended their research and has graduated.</p>
	<p>Reporting Period: 2021 (Jan-Dec)</p> <p>Direct – Culminating Experience – 100% success rate. Two of these 11 students previously failed to achieve the PLO at Reinforced level. Evidently they improved.</p>
	<p>Reporting Period: 2021 (Jan-Dec)</p>

4	<p>Direct – Course Embedded Work – Overall, the benchmark was not achieved, as three students at the reinforced level did not achieve the objective. However, one of these students came within 1 point of achieving; had he done so the benchmark would have been met. (80%, versus a threshold of 70%).</p>
	<p>Reporting Period: 2021 (Jan-Dec)</p> <p>Direct – Culminating Experience – 100% success rate. The 11 students who were assessed and achieved this PLO include the 2 students who failed it at the Reinforced level.</p>

- Assessment findings and subsequent action plan

BSCS

Date	Findings	Summary/Goals
2019 (Jan-Dec)	<p>PLO (f) - Communicate Effectively, PLO (g) Analyze Local and Global Impact, PLO (h) Continuing Professional Development, PLO (i) Current Techniques, Skills, Tools for Computing and PLO (j) Apply Design and Development Principles were assessed during this period. Benchmarks of 70% were met for all five PLOs assessed. Using rubrics, 90% to 99% of student samples were rated as satisfactory to exemplary on PLOs (g), (h), (i), and (j). However, only 70% of student samples were rated as satisfactory to exemplary on PLOs (f). While students showed mastery of skills on their virtual posters and cover letters, 30% of students were ranked as beginning or developing on the literature review.</p>	<p>Students and faculty collectively developed best practices for virtual posters.</p> <p>The assessment committee will develop a revised assessment schedule matching the new PLOs provided in ABET's latest requirements.</p> <p>Additionally, the department will revise its curriculum as needed for the new ABET standard.</p>



	<p>The assessment committee is made up of five tenured or tenure-track faculty members. Faculty teaching the courses also reviewed and reported on assessment data.</p>	
2020 (Jan-Dec)	<p>Our program met the goals of all assessed outcomes for 2020.</p> <p>The department assessment committee is made up of five people. All members are either tenured or tenure-track professors.</p> <p>Follow-up meetings are planned with the instructors teaching the assessed courses to further analyze the results.</p>	<p>We revised our curriculum to follow new guidelines from ABET. These changes included requiring a security class (CS 166) and a database class (CS 157a), revising the descriptions of two courses (CS 166 and CS 149), and dropping our "deep course" requirement. These changes are approved to begin in the academic year 2021/2022.</p> <p>Our program learning outcomes have also been revised to match ABET's requirements, and the assessment committee has voted to approve these changes. We did not assess outcome (j) this year, since it does not map to the new outcomes, and in Spring 2021 we will use the new outcomes for all assessed classes.</p> <p>We will revise the rubrics for all courses that we assess to align with the new outcomes. The plan is to modify each rubric at the beginning of the semester that it is being assessed.</p>
2021 (Jan-Dec)	<p>Our program met the goals of all assessed outcomes for 2021.</p>	<p>We are discussing standardizing CS 100w as a flipped course, and we are considering adding an additional topic to CS 160.</p>

	<p>The department assessment committee is made up of four tenured professors. Results are reviewed with instructors who teach the assessed courses.</p>	<p>All rubrics were revised to match ABET's latest requirements, including breaking out students by CS/SE/other where a large number of non-CS students attend. The performance indicators for CS 146 were revised. We will follow up on suggestions for CS 160 and CS 100w</p>
--	---	---

**MSCS**

Date	Findings	Summary/Goals
2020 (Jan-Dec)	<p>Our program met the goals of all assessed outcomes for 2020.</p> <p>The department assessment committee is made up of five people. All members are either tenured or tenure-track professors.</p>	<p>The BSCS curriculum has recently gone through some changes to align with the new guidelines from ABET. In particular, CS 157A (Introduction to Database Management Systems) and CS 166 (Information Security) have become core courses. As such, GCC would consider appropriate adjustments to the MSCS curriculum, including:</p> <ol style="list-style-type: none"> <li>1) Whether to remove CS 157A and CS 166 from elective courses.</li> <li>2) Whether to revise the syllabus of CS 265 (including its prerequisite - currently CS 149, whether to change to CS 166).</li> </ol>

		These action items / changes will be discussed and implemented after the departmental discussions and votes when applicable.
2021 (Jan-Dec)	<p>Our program met the goals of all assessed outcomes for 2021</p> <p>The department assessment committee is made up of five people. All members are either tenured or tenure-track professors</p>	<p>The GCC has considered appropriate adjustments to the MSCS curriculum including:</p> <p>Removal of CS 157A and CS 166 from elective courses.</p> <p>Revision of the CS 265 syllabus (including its prerequisite – currently CS 149, whether to change.</p> <p>These action items / changes will be discussed and implemented after the departmental discussions and votes when applicable.</p>

#### MSBI

Date	Findings	Summary/Goals
2020 (Jan-Dec)	<p>The program is new and still small (the first cohort of 3 students graduated last semester), but growing. No statistical meaning should be inferred from our results. Rather, the individuals who failed to meet the 2 objectives assessed this cycle should be contacted to determine whether their failure indicates weakness in the program.</p> <p>The Bioinformatics Curriculum Committee in the Computer Science Department consists of 3 tenure-track Bioinformatics instructors and is chaired by Department Chair Melody Moh.</p>	<p>Last year was our first assessment, and no improvements were indicated.</p> <p>We plan to design a student survey so that we can understand students' assessment of the program and how the program helps them acquire core knowledge and skills related to our program goals.</p>

2021 (Jan-Dec)	<p>PLOs 3 and 4 were assessed. PLO3 was passed. PLO4 was inconclusive: while the benchmark for non-capstone was not met, there were few students and the smallest possible improvement by 1 student would have changed the outcome.</p> <p>The Bioinformatics Curriculum Committee in the Computer Science Department consists of 4 tenure-track Bioinformatics instructors and is chaired by Department Chair Melody Moh.</p>	Expand the program by adding more courses.
----------------	--	--

- Finally a table below showing proposed changes and goals and their status update.

Proposed changes and Goals	Status Update	Date Reported
[BSCS] ABET has restructured PLOs. Review how these new PLOs map to our courses.	Completed.	March 2020.
<p>[BSCS]            Modify rubrics for outcome D.            Standardize the questions across sections (CS 146) to help create more uniformity in the results between sections.            Revise assessment rubrics to match with our new outcomes used for future assessment periods.</p>	Completed.	March 2021.
<p>[MSCS]            (1) Offer more upper-division and graduate courses.            (2) Discuss whether to remove CS 157A and CS 166 from elective courses.            (3) Discuss if needed to revise the syllabus of CS 265 (including its prerequisite - currently CS 149, whether to change to CS 166.</p>	<p>Completed.            (1) Added 6 new upper-division courses (CS 131, 134, 136, 168, 171, and 176), and 4 new graduate courses (CS 224, 225, 271, and 272).            (2) Removal of CS 157A and CS 166 from elective courses.</p>	May 2022.

	(3) Revision of the CS 265 syllabus.	
<p>[MSCS]</p> <p>(1) provide a clear description or roadmap example of how the courses and requirements should be handled throughout the two year period.”</p> <p>(2) Review and evaluate the questionnaires for future assessment on PLOs (a) and (b). In particular, a question regarding the ability of students to enroll in the courses they expected will be reviewed and adjusted accordingly.</p>	<p>(1) In-progress.</p> <p>(2) Complete: Added 6 new upper-division and 4 new graduate courses. Will continue to assess students’ enrollment needs.</p>	<p>(1)</p> <p>(2) May 2022.</p>
<p>[MSBI] Expand the program by adding more courses.</p>	<p>Completed.</p> <p>Added 2 new upper-division and 2 new graduate courses.</p> <p>Require one additional graduate elective course in MSBI program.</p>	<p>May 2022.</p>

Based on the WASC Rubric for Assessing the Quality of Academic Program Learning Outcomes, here are our outcomes

Criterion	BSCS	MSCS	MSBI
Comprehensive List	Developed	Developed	Developed
Assessable Outcomes	Highly Developed	Developed	Developed
Alignment	Highly Developed	Developed	Developed

Assessment Planning	Highly Developed	Developed	Developed
The Student Experience	Developed	Developed	Developing

**3f. Placement of Grads**

**BSCS**

<b>BSCS: 52 students took the survey in May 2022</b>		
Seeking jobs/higher studies	17	33%
Graduate School	6	12%
Employed	29	56%
Some Major Companies		Amazon, Google, Adobe, Meta, VMWare, IBM

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	Overall
<b>BSCS</b>	52	52	52	52	52	52	52
<b>Satisfied (including Strongly Agree and Agree)</b>	39	38	36	35	36	41	38
<b>Satisfied (%)</b>	75%	73%	69%	67%	69%	79%	73%
<b>Overall Average of Satisfied:</b>	<b>72%</b>						

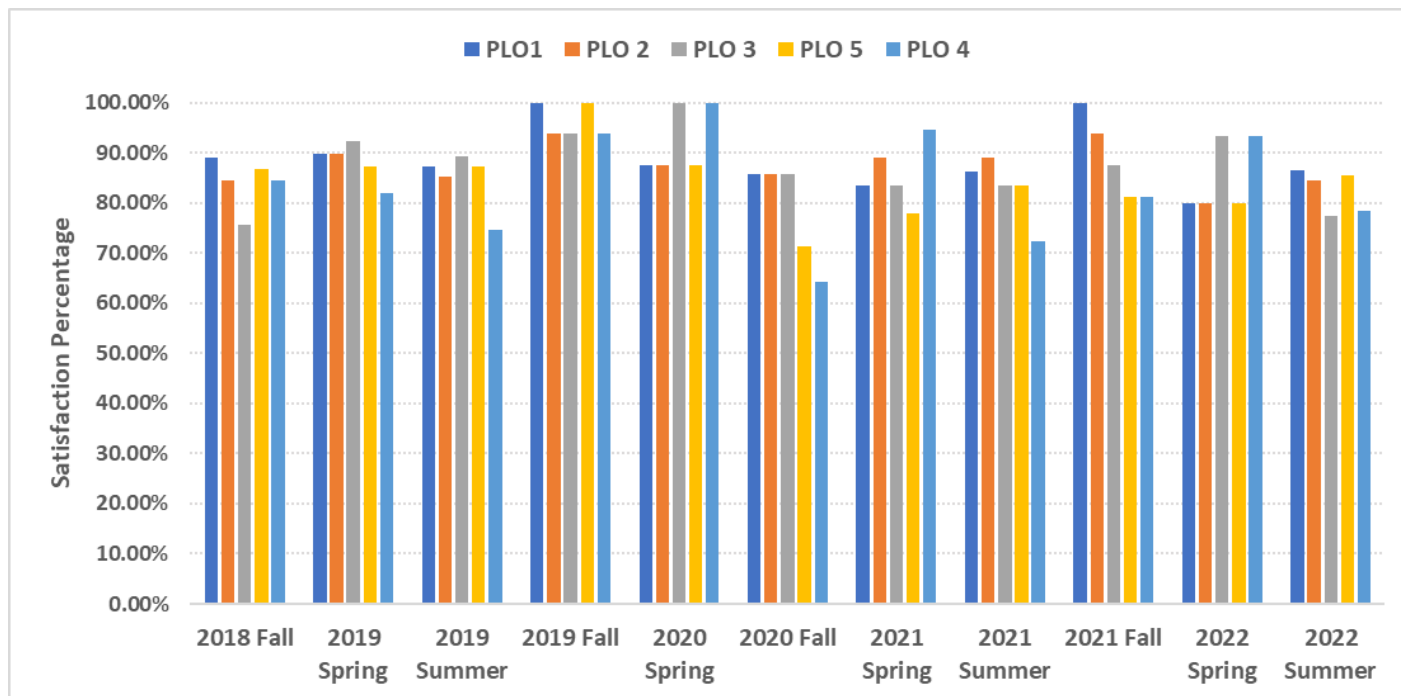
We had Feedback evaluation forms filled out by internship managers. Below data over the past few years proves that the managers of the organizations where our students intern. The data proves that they are not only satisfied with our academic program's orientation to their

organization needs but also would consider employing the current interns on a full-time basis upon graduation. These provide an indirect assessment (similar to advisor board or alumni feedback) on students' learning assessment.

Semester	Is this Internship student's academic program oriented to the needs of your organization?	Are you considering employing this student on a full-time basis upon graduation?
2018 Fall	87.50%	65.00%
2019 Spring	93.94%	65.71%
2019 Summer	82.61%	63.83%
2019 Fall	93.33%	43.75%
2020 Spring	100.00%	75.00%
2020 Fall	92.31%	50.00%
2021 Spring	82.35%	88.24%
2021 Summer	91.43%	82.86%
2021 Fall	81.25%	75.00%

2022 Spring	80.00%	73.33%
2022 Summer	92.13%	58.43%
<b>Average</b>	<b>89%</b>	<b>68%</b>

The feedback form also asks these managers if our PLOs are fulfilled in the internship. Their response is graphed below with the sum of Outstanding and Above Average (not considering Acceptable, Below Average, Unsatisfactory, and Not Observed) values over the past years. These are the data which support the five outcomes listed under ABET's Criterion 3 - Student Outcome.

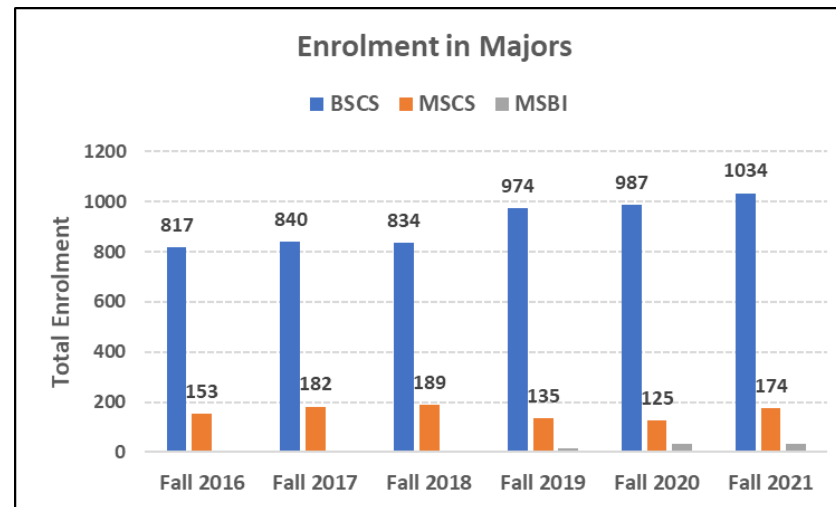


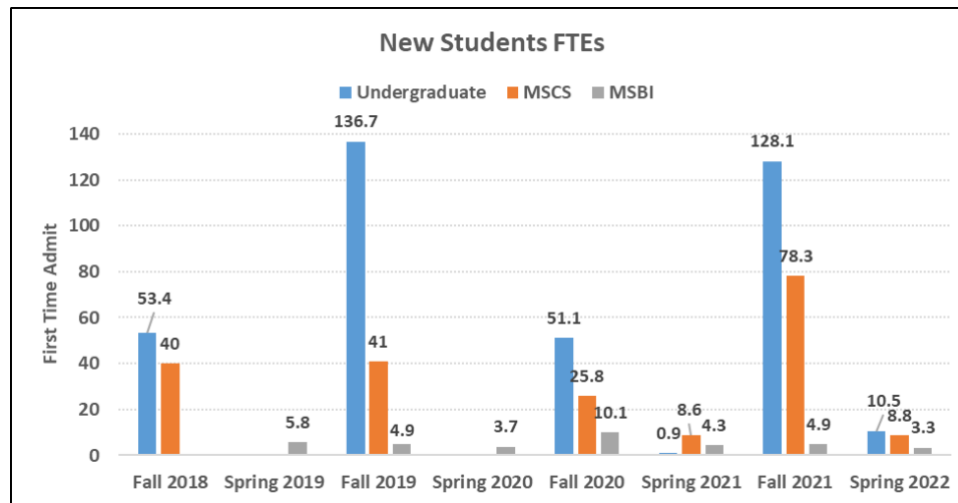
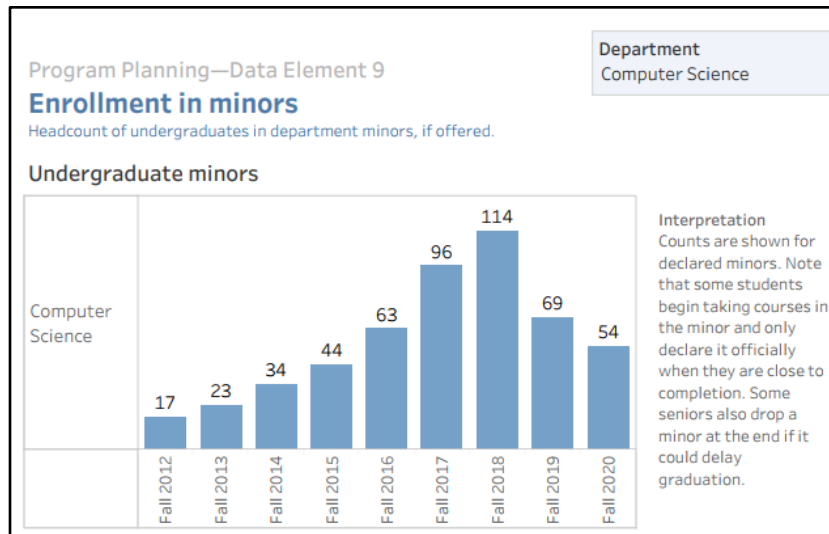


## 4. PROGRAM METRICS AND REQUIRED DATA

### 4a. Enrollment Rates

Undergraduate enrollment has been increasing steadily. We expect this trend to continue. The MSCS enrollment rate also increases with a slight dip in fall 2019 and fall 2020 but thereafter they increase. We expect them to keep increasing along with our MSBI enrollment rates. The graphs for enrolment in major, enrolment in minor and new student FTEs for all the three programs (BSCS, MSCS, MSBI) are given below.





Source: [http://ir.sjsu.edu/Students/Enrollment/enroll\\_major.php](http://ir.sjsu.edu/Students/Enrollment/enroll_major.php)

**4b. Retention and Graduation Rates**

**Retention Rates**

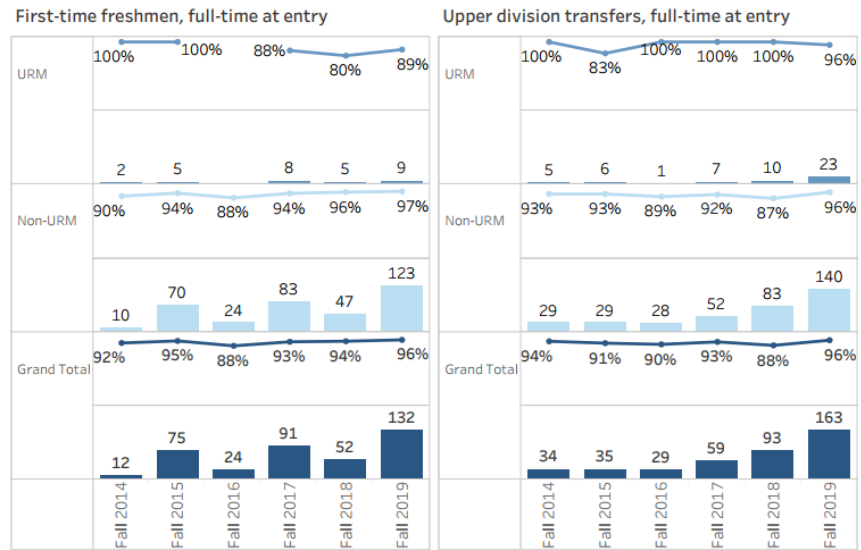
The department's retention rates are shown in the graph below.

Entry Major Computer Science	Entry Concentration Computer Science
---------------------------------	---

Program Planning—Data Element 6

### Undergraduate retention rates

The number of new undergraduates who entered the program and their rate of persistence one year later in any program at SJSU. Additional detail is provided on underrepresented minority (URM) students in the program.



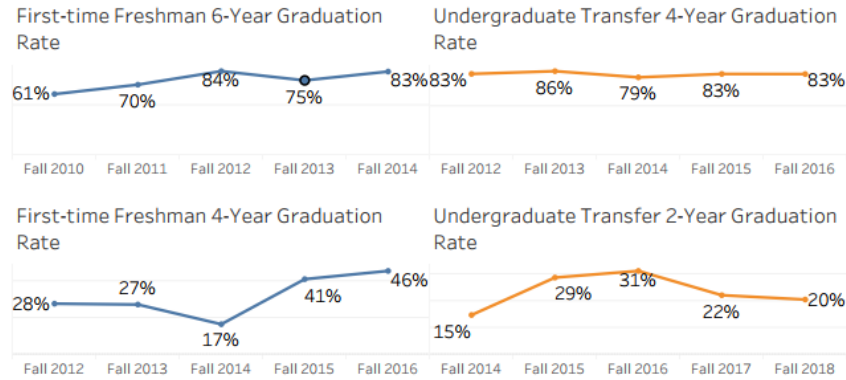
### Graduation Rates

Program Planning—Data Element 7

Entry Major	Entry Concentration
Computer Science	Computer Science

**Undergraduate graduation rates and goals**

Undergraduate graduation rates are shown by level of entry. Students are tracked under their major at admission, but graduation in any SJSU program counts toward the department's graduation rate.

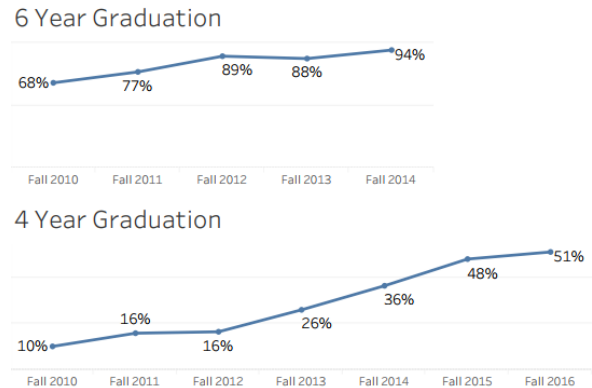


Program Planning—Data Element 8

Junior Major	Junior Concentration
Computer Science	All

**Native junior graduation rates**

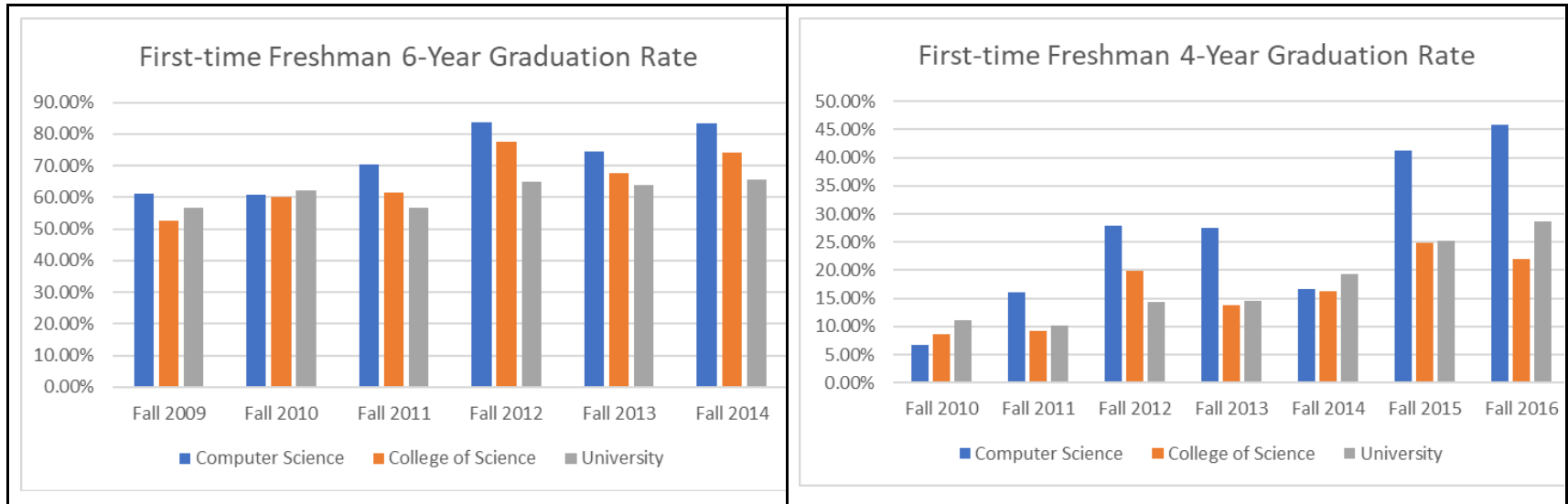
Rates for full-time freshmen entrants from any major who were in this major as of the fifth semester. This view may be informative for undergraduate programs with a large number of incoming changes of major.

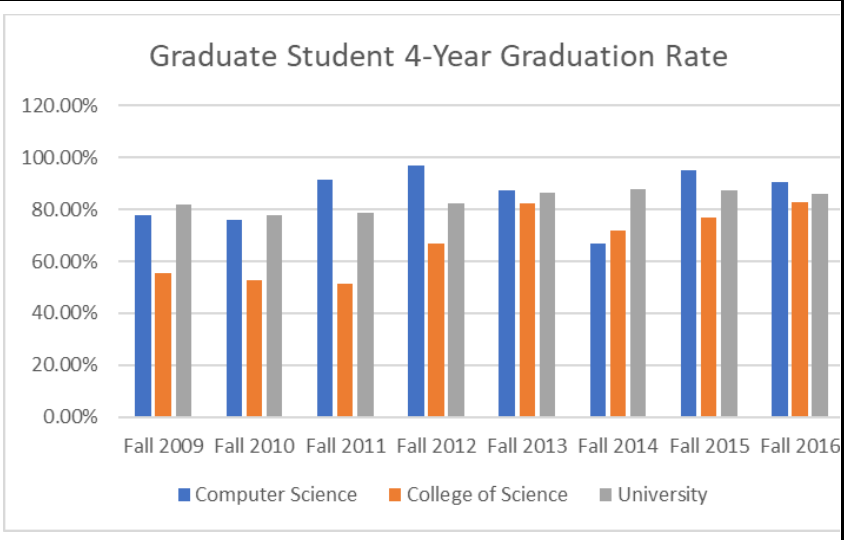
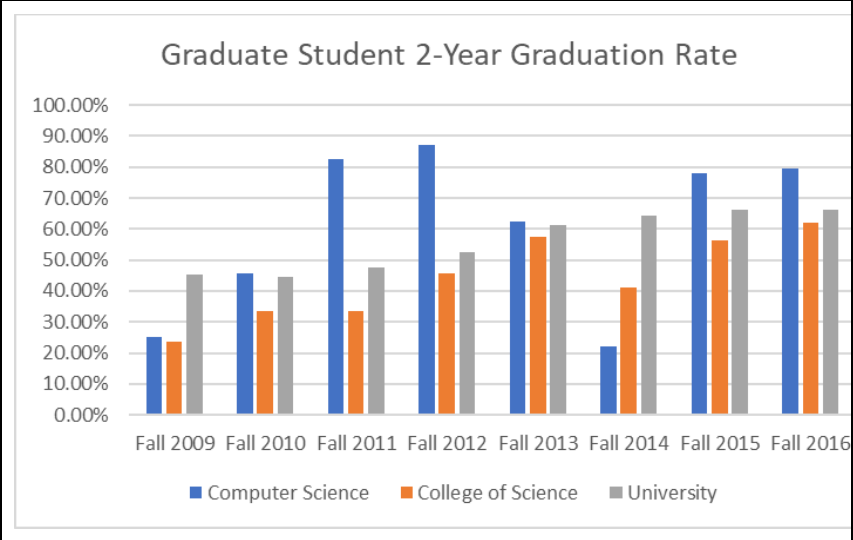
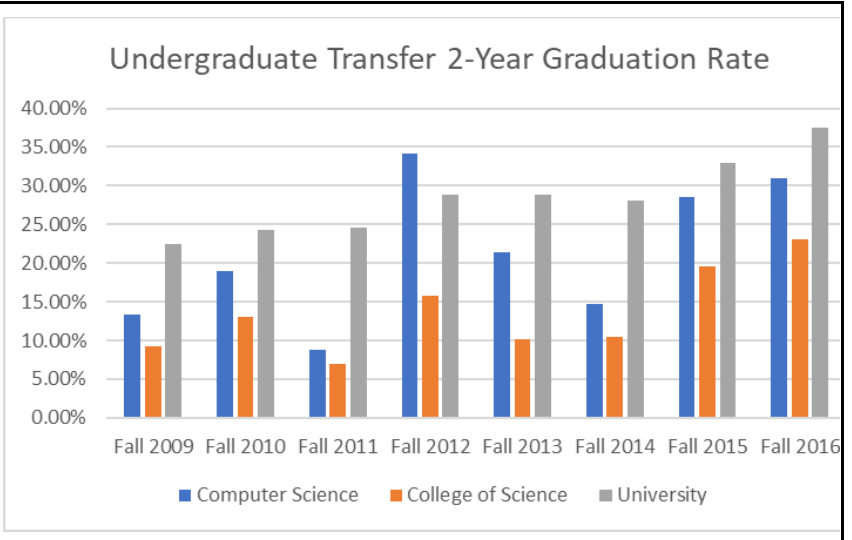
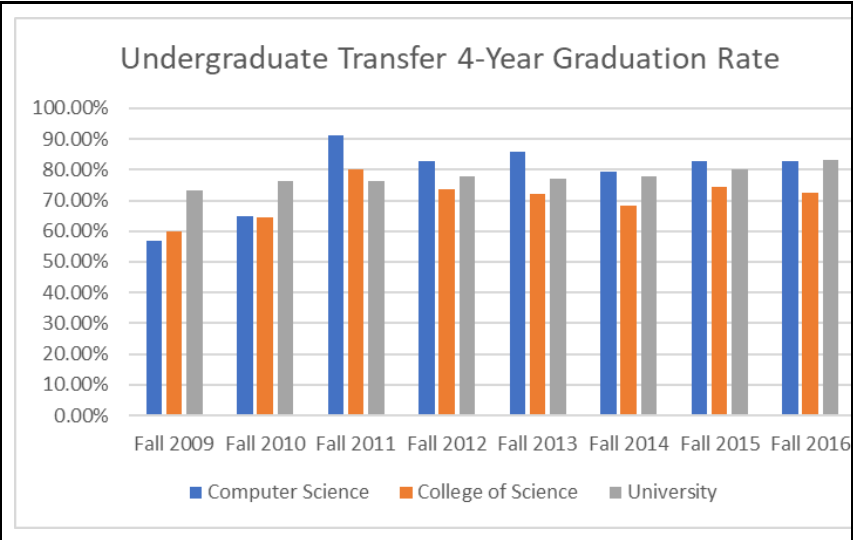


**Method notes**  
 This version of the graduation rate is similar to a typical freshmen cohort rate, only it attributes the credit to whatever major the student held as of the start of the junior year. However, the starting point of the cohort is still the freshmen admission term. The graduation is attributed to this major regardless of the ultimate degree major.

The first-time freshman 4-year and 6-year graduation rates show a steady increase throughout the years, with a slight dip in fall 2013 and fall 2014 (previous assessment cycle). In general, Computer Science has higher first-time freshman 6-year and 4-year graduation rates compared to the College of Science and the University, with an exception in fall 2010 (previous assessment cycle), where University had the highest

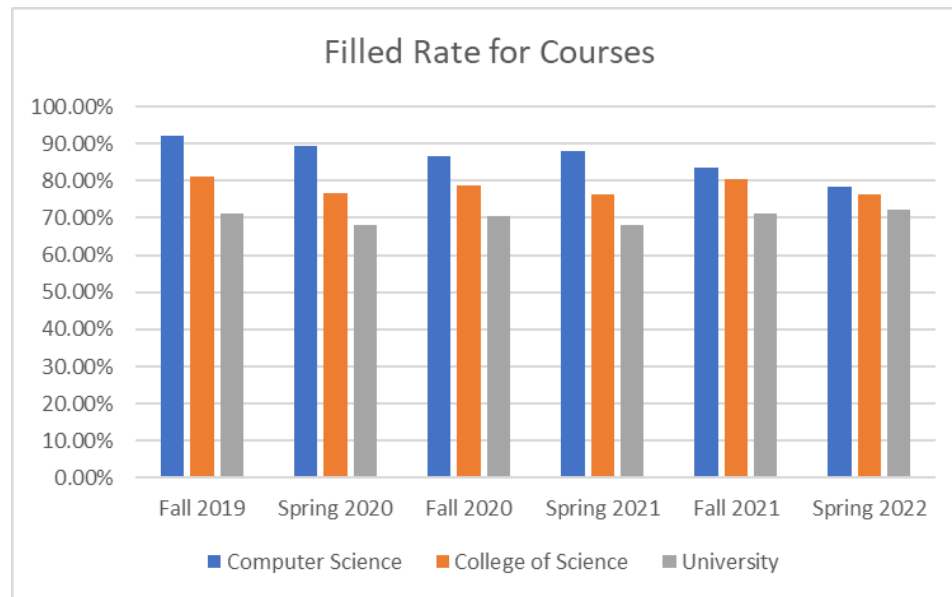
graduation rate for both 4-year and 6-year first-time freshman. The graduate student 2-year and 4-year graduation rates for Computer Science showed an increase from fall 2010 to fall 2012, then a dip for both in fall 2013 and fall 2014 (both for previous assessment cycle), and finally a rise in fall 2015 and fall 2016. Details could be found in [Appendix B Graduation Rates](#).





**4c. Headcount in sections**

The following chart compares head count per section for lecture courses across the department, college of science, and university. The department's numbers exceed those of the university's and college's. Detailed table could be found in the [Appendix C Headcounts](#)



**4d. FTES, Induced Course Load Matrix (ICLM)**

**Number of Freshmen, Sophomore, Junior, Senior, etc. enrolled in each year**

<b>BSCS</b>	Fall 2016	Fall 2017	Fall 2018	Fall 2019	Fall 2020	Fall 2021
Fr	31	82	47	99	35	104
So	91	61	93	97	104	55
Jr	153	172	145	220	185	181
Sr	389	343	360	408	507	485
Gr	153	182	189	150	156	209
<b>Total</b>	<b>817</b>	<b>840</b>	<b>834</b>	<b>974</b>	<b>987</b>	<b>1034</b>
FTEs	678.8	696.2	695.4	833	869.2	864
<b>MSCS</b>	Fall 2016	Fall 2017	Fall 2018	Fall 2019	Fall 2020	Fall 2021
<b>Total</b>	<b>153</b>	<b>182</b>	<b>189</b>	<b>135</b>	<b>125</b>	<b>174</b>
FTEs	101.8	123.9	132.5	93.4	83.6	116.3
<b>MSBI</b>			Fall 2018	Fall 2019	Fall 2020	Fall 2021
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>15</b>	<b>31</b>	<b>35</b>
FTEs				12.2	25.9	26.8

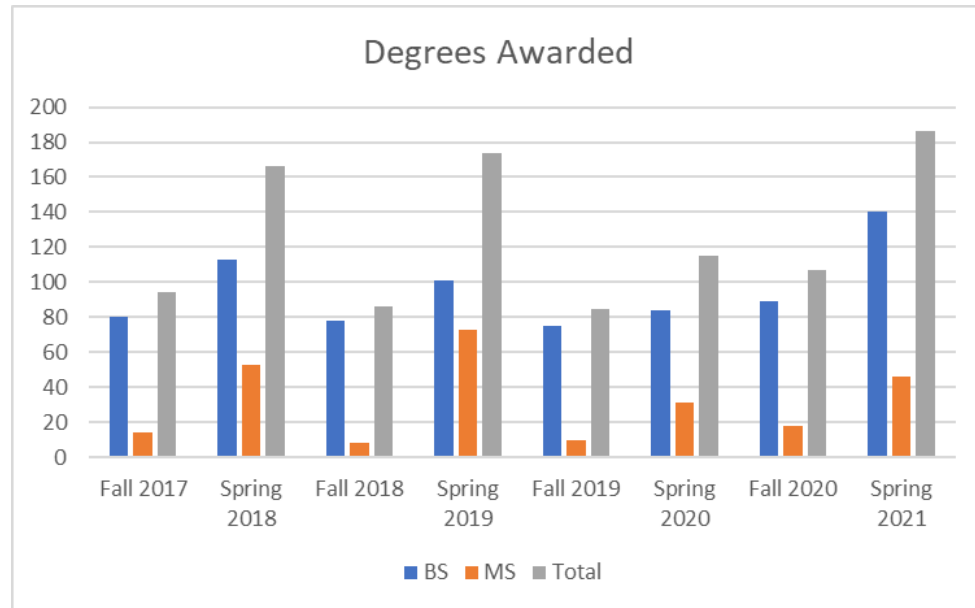
Source: [http://ir.sjsu.edu/Students/Enrollment/enroll\\_demographics.php](http://ir.sjsu.edu/Students/Enrollment/enroll_demographics.php)

<b>ICLM: All student types, All courses</b>	Fall 2020	Spring 2021	Fall 2021	Spring 2022
FTES	558	498	531	482

Please refer to [Appendix D ICLM](#) for more information.

### Degrees Awarded





Degrees Awarded	Fall 2017	Spring 2018	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021
BS	80	113	78	101	75	84	89	140
MS	14	53	8	73	10	31	18	46
TOTAL	94	166	86	174	85	115	107	186

Source: [http://www.iea.sjsu.edu/Students/Degrees/degree\\_department.php](http://www.iea.sjsu.edu/Students/Degrees/degree_department.php)

#### 4e. FTEF

##### FTEFs Computer Science

FTEF Computer Science	2016/17 Fall 2016	2016/17 Spr 2017	2017/18 Fall 2017	2017/18 Spr 2018	2018/19 Fall 2018	2018/19 Spr 2019	2019/20 Fall 2019	2019/20 Spr 2020	2020/21 Fall 2020	2020/21 Spr 2021
Tenured	8.6	8.8	7.5	7.2	9	8.9	5.4	6.6	8.5	7
Probationary	5	3.9	2.5	2.8	5.3	4.8	6.3	5.8	8	6.8
Temporary	9	9.5	11.9	11.7	10.1	7.8	11	9.3	11.3	10.9
Others							0.2	1.3	1.6	1
Total	22.6	22.3	22	21.7	24.4	21.5	22.9	23	29.4	25.7

#### 4f. SFR

##### SFR Computer Science

SFR Computer Science	2016/17	2016/17	2017/18	2017/18	2018/19	2018/19	2019/20	2019/20	2020/21	2020/21
	Fall 2016	Spr 2017	Fall 2017	Spr 2018	Fall 2018	Spr 2019	Fall 2019	Spr 2020	Fall 2020	Spr 2021
Tenured	17.4	16.2	16.1	16.8	17.2	16.9	15.7	17.4	13.5	18.5
Probationary	26.6	25.7	34.3	30.4	28.7	25.6	29.5	24.7	22.8	21.6
Temporary	38	35.1	37	32.8	36.3	43.3	38.1	42.9	39.1	39.8
Others							19.3	34.4	73.5	50.9
Total	27.6	26	29.5	27.2	27.6	28.4	30.3	30.5	29.2	29.6

**SFR All University: For Student to Faculty Ratio (SFR) Instructional Faculty by College for the years 2016 (fall), 2017, 2018, 2019, 2020 (spring and fall), and 2021 (spring), please Refer to [Appendix E SFR \(Student to Faculty Ratio\)](#)**

**4g. Percentage T/TT Faculty**

**Percentage of tenured/tenure-track (T/TT) faculty**

Computer Science	2016/17	2016/17	2017/18	2017/18	2018/19	2018/19	2019/20	2019/20	2020/21	2020/21	2021/22	2021/22
	Fall 2016	Spr 2017	Fall 2017	Spr 2018	Fall 2018	Spr 2019	Fall 2019	Spr 2020	Fall 2020	Spr 2021	Fall 2021	Spr 2022
Tenured	12	13	12	11	13	13	10	10	10	11	11	11
Probationary	6	6	3	4	6	6	8	8	8	9	10	10
Temporary	25	27	32	32	24	18	26	22	28	24	30	24
Others		0	0	0	0	0	1	5	6	4	4	3
TOTAL	43	46	47	47	43	37	45	45	52	48	55	48
Percentage T/TT Faculty	42%	41%	32%	32%	44%	51%	40%	40.00%	35%	42%	38%	44%
College of Science	2016/17	2016/17	2017/18	2017/18	2018/19	2018/19	2019/20	2019/20	2020/21	2020/21	2021/22	2021/22
	Fall 2016	Spr 2017	Fall 2017	Spr 2018	Fall 2018	Spr 2019	Fall 2019	Spr 2020	Fall 2020	Spr 2021	Fall 2021	Spr 2022
Tenured	85	82	81	75	81	77	74	71	79	78	74	75
Probationary	39	40	41	41	39	43	45	50	53	55	51	51
Temporary	125	129	134	134	136	137	147	133	132	120	145	132
Others	89	91	101	97	113	105	95	97	103	99	107	94
TOTAL	338	342	357	347	369	362	361	351	367	352	377	352
Percentage T/TT Faculty	37%	36%	34%	33%	33%	33%	33%	34%	36%	38%	33%	36%
All University	2016/17	2016/17	2017/18	2017/18	2018/19	2018/19	2019/20	2019/20	2020/21	2020/21	2021/22	2021/22
	Fall 2016	Spr 2017	Fall 2017	Spr 2018	Fall 2018	Spr 2019	Fall 2019	Spr 2020	Fall 2020	Spr 2021	Fall 2021	Spr 2022
Tenured	442	432	425	410	414	413	395	384	406	407	400	407
Probationary	184	184	212	210	227	228	249	248	272	273	267	262
Temporary	1151	1169	1189	1192	1216	1215	1264	1248	1230	1236	1299	1271
Others	227	215	239	227	249	239	242	247	237	217	258	227
TOTAL	2004	2000	2065	2039	2106	2095	2150	2127	2145	2133	2224	2167
Percentage T/TT Faculty	31%	31%	31%	30%	30%	31%	30%	30%	32%	32%	30%	31%

**5. PROGRAM RESOURCES**

**5a. Faculty number and qualifications**

The department currently has the following faculty with the undermentioned research interest.

<b>Name</b>	<b>Position</b>	<b>Research Interest</b>
<b>Robert Chun</b>	<b>Professor</b>	<b>Computer Architecture, VLSI System Design, CAD/CASE, Artificial Intelligence, Software Re-engineering</b>
<b>Melody Moh</b>	<b>Professor, Department Chair, MS Bioinformatics Coordinator</b>	<b>Cloud Computing, Cybersecurity, Mobile Networking, Machine Learning</b>
<b>Teng-Sheng Moh</b>	<b>Professor, MSDS Graduate Advisor</b>	<b>Machine Learning, Distributed Computing,, and Combinatorial and Non-linear Optimization</b>
<b>Jon Pearce</b>	<b>Professor</b>	<b>Functional Programming, Type Theory, Denotational Semantics</b>

<b>Christopher Pollett</b>	<b>Professor, MSCS Program Coordinator</b>	<b>Theory of Computation Logic, Logic Programming, Databases, Cryptography, Quantum Computation</b>
<b>Mark Stamp</b>	<b>Professor</b>	<b>Information Security, Machine Learning, Cryptography</b>
<b>Chris Huan-Chi Tseng</b>	<b>Professor</b>	<b>Semantic Web, Intelligent Agents, Soft Computing, Bioinformatics</b>
<b>Thomas Austin</b>	<b>Associate Professor, Assessment Coordinator</b>	<b>Programming Language Design, Programming Language Security, Malware Analysis, Web Security</b>
<b>Katerina Potika</b>	<b>Associate Professor</b>	<b>Analysis of Algorithm, Graph Drawing, Computer Networks, Algorithmic Game Theory</b>
<b>Suneuy Kim</b>	<b>Associate Professor</b>	<b>Performance Evaluation, Relational Databases, NoSQL Databases, Object-Oriented Programming</b>

<b>David Taylor</b>	<b>Associate Professor</b>	<b>External Memory Computations, Query Processing in Database Systems, Design and Analysis of Online, and Approximation Algorithms</b>
<b>Leonard P. Wesley</b>	<b>Associate Professor</b>	<b>Bioinformatics, Machine Learning, Drug Development, Genomic Analysis</b>
<b>Philip Heller</b>	<b>Associate Professor</b>	<b>Bioinformatics, Visualization, Analysis of Algorithms, Machine Learning</b>
<b>William Andreopoulos</b>	<b>Assistant Professor</b>	<b>Bioinformatics, Data Mining, Software Engineering</b>
<b>Nada Attar</b>	<b>Assistant Professor</b>	<b>Human-Computer Interaction, Computer Vision, Machine Learning, Data Science</b>
<b>Alex Chakarov</b>	<b>Assistant Professor</b>	<b>Computer Science Education, Physical Computing, Human-Computer Interaction</b>

<b>Fabio Di Troia</b>	<b>Assistant Professor</b>	<b>Machine Learning, Cybersecurity, Malware Detection</b>
<b>Genya Ishigaki</b>	<b>Assistant Professor</b>	<b>Resource Allocation Problems Related to Adaptive and Autonomous Next-generation Networking</b>
<b>Mei-Chong Wendy Lee</b>	<b>Assistant Professor, MSCS Graduate Advisor</b>	<b>Specialized in Bioinformatics, Cloud Computing, Big Data</b>
<b>Benjamin Reed</b>	<b>Assistant Professor</b>	<b>Distributed Systems, Operating Systems, Storage Network Protocols</b>
<b>Navrati Saxena</b>	<b>Assistant Professor, Program Planning and ABET coordinator</b>	<b>5G Wireless, IoT, Social Networking, Device to Device (D2D), Vehicular Communication, Wireless Communication</b>
<b>Ching-seh Wu</b>	<b>Assistant Professor</b>	<b>Big Data and Cloud Computing, Machine Learning, Artificial Intelligence, Software and Web Engineering</b>

**Apart from that, the department also has the following lecturers:**

## Lecturers

### Name (Industrial expertise)

1. Dominic Abucejo (Software development, C/C++)
2. Christin Boyd (English technical writing)
3. Frank Butt (Database management systems; Senior manager, IBM)
4. Debra Caires (English technical writing)
5. Dr. Sam Chen (Data scientist, PG&E)
6. Yan Chen (Information security, formal languages)
7. Auston Davis (Information security, CIO of Heartflow, Inc.)
8. Dr. Ahmed Ezzat (Database management systems, cloud computing)
9. Jahan Ghofraniha (Database management systems, software engineering)
10. Debra Hunter (English technical writing)
11. Rula Khayrallah (Artificial intelligence, machine learning)
12. Dr. Raina Levesque (English technical writing)
13. Dr. Kong Li (Cloud computing, operating systems)
14. Dr. Alpha Luk (Machine learning, data science)
15. Ron Mak (Compiler; NASA Ames consultant, PI of multi-million dollars grant from NASA Ames)
16. Dr. Ramin Moazzeni (Database management systems. operating systems; Sr. Manager, Oracle)
17. Dr. Faramarz Mortezaie (Operating systems, computer networks; CS Dept Chair, West Valley College)
18. Dr. Yulia Newton (Machine learning, bioinformatics)
19. Paul Nguyen (Computer Networks; Software Engineer, AT&T)
20. Kaushik Patra (Computer architecture)
21. Alesya Petty (English technical writing)
22. Dr. Paul Sanghera (Machine learning, information security)
23. Tazmina Sharmin (Program language paradigms)
24. Kevin Smith (Computer graphics, computer games)
25. Dr. Chao-Li Tarng (Information security, former Cisco director)
26. Dr. Albert Tsao (Computer algorithms, formal languages)
27. Kenward Tsang (Software engineering)

- 28. Dr. Qi Yang (Computer languages, Professor Emeritus from University of Wisconsin)
- 29. Ahmad Yazdankhah (Program design, formal languages)

**5b. Support staff**

**The department has the following support staff members:**

- 1. Marcia Block, Administrative Analyst
- 2. Jutomue Quenavah, Administrative Support Coordinator

**5c. Facilities**

Below is a list of classrooms, laboratories, offices, and other facilities available for instruction and program operation

Room	Function category	Function detail (e.g. Faculty or staff member whose Office or lab it is, or staff member in charge of space)
DH 282	Office: Lecturers	All CS Lecturers
DH 450	Laboratory: Teaching	
MQH 207	Office: Faculty	Melody Moh (chair)
MQH 208	Office: Admin	CS Department Office
MQH 208A	Office: Admin	CS Department Office



MQH 209	Office: Admin	Dept Mail Rm
MQH 210	Conference Room	Research, Lunch break, Dept meeting
MQH 211	Office: Faculty	Phil Heller, Mike Wu
MQH 212	Office: Faculty	Leonard Wesley, David Taylor
MQH 213	Office: Faculty	Chris Tseng, Ben Reed
MQH 214	Office: Faculty	Chris Pollett, Navrati Saxena
MQH 215	Office: Faculty	Katerina Potika, Genya Ishigaki
MQH 216	Office: Faculty	Mark Stamp, Thomas Austin
MQH 217	Office: Faculty	Suneuy Kim, Fabio Di Troia
MQH 218	Office: Faculty	Nada Attar, Khayrallah
MQH 225	Classroom	
MQH 226	Study Lab	Study Lab

MQH 227	Student Club	CS Student Club Rm
MQH 228	Student Club	Storage Room
MQH 229	Conference Room	Research use
MQH 236	Storage	Storage Room
MQH 325	Faculty Research Lab	Research and Server Room
MQH 411	Office: Faculty	Teng Moh, Jon Pearce
MQH 413	Office: Faculty	Robert Chun, Wendy Lee
MQH 416	Office: Faculty	William Andreopoulos, Dr, Chakarov
MQH 422	Laboratory: Teaching	
SCI 311	Classroom	
DH239	Office: Faculty	F. Abri and Sengupta

## 6. OTHER STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND CHALLENGES

### Strengths

- **Strong BSCS and MSCS degree programs, high number of applicants, high enrollment numbers, high graduation rates:** The CS Department continues to offer strong BSCS and MSCS degree programs that attract a large number of applications each year with increasing enrollment numbers. Graduation rates are consistently higher than the College average.
- **New data science degree programs:** We launched MSBI (2018), MSDS (2020), and BSDS (2023 Spring) to meet the increasing demands for Data Science graduates in Silicon Valley.
- **Major gift:** The CS Department received an Implementation Grant, awarded (subcontracted) by the Center for Inclusive Computing, Northeastern University (PI: Melody Moh, Co-PI: Elaine Collins, Wendy Lee, and Rula Khayrallah), in the amount of \$800,000, for two years (Oct 2021 – Sept 2023), for increasing the number of women and minority undergraduate students in computing.
- **External funding:** Our faculty members are PI or coPI of research and education external fundings over 6 million dollars during the last five years.
- **Research Productivity:** We have over 300 peer reviewed publications (journals, conferences, book chapters) over the past six years. Many of these papers are co-authored with SJSU students.
- **Best Paper Awards:** Received the following (most of them with our *undergraduate or graduate students*) awards:
  - Chin Tsai (**MSCS**) and Melody Moh. Cache Management for 5G Cloud Radio Access Networks. *Proc. of 12th ACM International Conference on Ubiquitous Information Management and Communication (IMCOM)*, Langkawi, Malaysia, January 2018. [**Honorable Paper Award**]
  - Dylan Wang (**MSCS**) and Teng-Sheng Moh. Hearthstone AI: Oops to Well Played. *Proceedings of the 55th ACM Southeast Conference (ACMSE)*, Kennesaw, Georgia, Apr. 2019, pp. 149-154. [**Best Paper Award**]
  - Mike Wu. ACM 2019 International Conference on Data Science and Information Technology, July 18-21, 2019, Seoul, South Korea. [**Best Presenting Paper Award**]
  - Sharan Duggirala (**MSCS**) and Teng-Sheng Moh. A Novel Approach to Music Genre Classification using Natural Language Processing and Spark. *Proceedings of the 14th International Conference on Ubiquitous Information Management and Communication (IMCOM)*, Taichung, Taiwan, Jan. 2020, 8 pages. [**Honorable Paper Award**]
  - Andrew Jong (**BSCS**), Gaurav Kuppa (BSCMPE), Xin Liu, Teng-Sheng Moh, and Ziwei Liu, **1st Place Award** in Track 4: Video Virtual Try-on Challenge, Towards Human-Centric Image/Video Synthesis and the 4th Look Into Person (LIP) Challenge, 2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition, CVPR Workshops, Seattle, Washington, June 2020.
  -

## Challenges

- Difficult for the department to retain junior faculty due to high cost of living, attractive industrial opportunities, and competition from other universities.
- Lack of relevant resources such as office space, labs, large classrooms, etc. Currently every two T/TT faculty members share one tiny office in MH (2nd floor and four offices in the 4th floor), and all 30 lecturers share one large office in DH (DH 281).

## 7. ASSESSMENT OF STUDENT LEARNING IN GE COURSES (IF APPLICABLE)

### 7.1 GE Summary and Reflection

For the next program planning cycle CS 22A for area B4 will be used and CS 100W for area Z will continue without any modifications.

CS 22A (Python for Everyone) aims to provide students in non-computing majors with the opportunity to learn and apply computer programming to solve real-world problems, exposing them to high-demand skills. It aims to attract diverse and female populations to attract their interest to Computer Science and Data Science degree programs, and finally with the goal to increase the diversity in the STEM workforce.

CS 100W (technical Writing Workshop) is advanced writing through preparation of technical reports and presentations. It targets in improving skills for writing subject-related reports, project proposals and personal resumes through practice and evaluation. Its assignments are related to issues concerning careers in computer science.

### 7.2 Interpretation of Assessment Results and Subsequent Actions

Each year, the department prepares a brief (two page maximum) report that documents the assessment of the course during the year. These reports document the GLO was assessed each semester, number of sections, number of students and their assessment result. The reports for the last 6 years (AY 2015-2016 ~ AY 2020-2021) are attached in the [appendix F GE Assessment](#). In a nutshell, every year the course is always taught with a stated enrollment limit (25 students per section); generally no modifications are planned for the next cycle; and GELOs are met with a good number of students performing exemplary and satisfactory every semester.

## 8. DEPARTMENT ACTION PLAN

### A. New/Enhanced Degree Programs

The CS Department would like to consider development of the following degree programs:

- New BS CS+X Programs to Increase STEM Diversity: Following the success of developing the new BSDS program, with the goal of developing CS-focused interdisciplinary degree programs to serve more women and minority students and to increase STEM workforce diversity, we plan to develop one or more CS+X BS degree programs, including a new BS - CS and Linguistics program currently in progress (jointly developed with Dept of Linguistics and Language Development), currently reviewed by the College of Science.
- New Joint MS Programs: Following the same principle as above, we plan to develop more joint MS programs, including MS - Computational Linguistics, which is in the initial developing phase jointly with the Dept of Linguistics and Language Development.
- 4+1 Program: We plan to develop 5-year BS/MS degree programs for Computer Science, and may expand to Data Science, CS+Linguistics, CS+X, etc.

### B. Improving Student Success and Student-Body Diversity

The CS Department will continue with its efforts in increasing student diversity and student success, partly supported by the CIC grant:

- Newly hired Academic Advisor (paid by the CIC grant) will help the recruitment, retention, and graduation of women and URM students.
- Increase the support of CS-focused student clubs to increase retention, graduation, and success rates of students. (Efforts include holding the "Club Day", such as the ones on Sept 2 and Sept 9 , 2022 for 7 CS-related clubs (including two CS women clubs) to recruit club members; the events were well-attended by more than 300 students.

### C. Increase in Enrollment

We will consider increases in BSCS and BSDS enrollments, if appropriate resources (including faculty, staff, and spaces) are provided while maintaining the current level of SFR and T/TT percentage.

### D. Staff and Resource Implications

With the above action plans, in particular items (A) and (C) , we therefore seek additional T/TT faculty members, full-time lecturers, office staff, and office and classroom spaces, proportionately according to the increase in student enrollment and FTES. We aim to maintain the current levels

of SFR and T/TT percentage, so that we can continue to deliver quality programs, to attract a high number of applicants, high enrollments, and high graduation rates, and to increase the diversity of the student body, thereby increasing the diversity of the STEM workforce.

## 9. APPENDICES

### A. Details of the BSDS Program and its Self-conducted Student Interest Survey

**The CS department is offering a new degree program - Bachelor of Science in Data Science. More about the program is mentioned below:**

#### 1) Purpose and strengths

The developing of the proposed program is motivated by an Implementation Grant, awarded (subcontracted) by the Center for Inclusive Computing, Northeastern University (PI: Melody Moh, Co-PI: Elaine Collins, Wendy Lee, and Rula Khayrallah), in the amount of \$800,000, for two years (Oct 2021 – Sept 2023). The proposed BS Data Science program is designed to address the vast shortage of data scientists in today's job market by providing a computing-focused, interdisciplinary in nature data science education that trains students with solid mathematical, programming, data management, machine learning, and communication skills. The program will utilize the existing resources of the Department of Computer Science at San José State University. It will harness a wide array of curriculum courses already offered by the department and a broad scope of faculty expertise in computer science, data science (including visualization, processing, and analysis of data), machine learning, artificial intelligence, etc. The new program will also complement the existing Bachelor of Science in Information Science and Data Analytics (BSISDA) program on campus, and along with it, provide students with a variety of degree options in data science and data analytics based on their corresponding levels of mathematical background, analytical capability, and career interests. Lastly, the proposed program is intended to address the critical need of an affordable BS in Data Science degree program in the Bay Area that can serve minority and low-income students.

#### 2) Fit with the institutional mission or institutional learning outcomes

Data science is evidently multidisciplinary in nature, requiring specialized knowledge and skills from computer science, with supporting proficiencies in mathematics, statistics, and application domains. Offering such a degree at SJSU aligns well with its institutional learning outcomes in preparing students with *specialized, applied, and integrative knowledge and skills*. Moreover, the introduction of a data science degree at the undergraduate level will enable SJSU to offer a variety of data-focused degrees and supply graduates at different

technical levels to meet various demands in the job market of the Silicon Valley, thus better fulfilling its *social and global responsibilities* and accomplishing its mission in *powering the Silicon Valley*.

### 3) The compelling reasons for offering the program at this time

- **Data Science Career Outlook**

The College Post reported: “Careers in data science are not just lucrative — they’re on the rise, too! According to the US Bureau of Labor Statistics, the job outlook for data scientists and other computer and information research is projected to increase by 15 percent between 2019 and 2029. This employment growth rate is much faster than average for all occupations, which is only an average of four percent. It’s a great time to become a data scientist!”

- **Market Demand for Data Scientists.**

Since 2017, study through the research partnership between Burning Glass Technologies, the Business-Higher Education Forum (BHEF), and IBM, had found:

- The number of job listings for core Data Science and Analytics (DSA) positions is projected to grow by nearly 364,000 to approximately 2,720,000.
- In 2017, it was reported that the fastest-growing roles are Data Scientists and Advanced Analysts, which currently have an average annual salary of \$94,576 and are projected to see demand spike by 28% (from 48,347 to 61,799) by 2020. As of October 1, 2021, according to Indeed.com, the average salary for a Data Scientist in the USA is \$117,217.
- DSA jobs remain open for an average of 45 days, five days longer than the market average.

- **Lack of rigorous, balanced data science programs in today’s universities.** Today’s universities have not been able to catch up with the trend in the job market, and many have only taken small steps to respond by adding data science specializations or certificates under traditional disciplines. Accordingly, graduates from such programs lack adequate training in other supporting disciplines of data science. The proposed program offers essential coursework from both statistics and computer science specific to data science and can provide a technically sound and balanced education in this emerging field. We expect graduates of the program to help fill the urgent market need for data scientists.

- **Student interest.** There is enormous student interest in data science and related areas as evidenced by a recent student interest survey of current students at SJSU (with about 190 responses), including the following results:
  - a) About 73% of respondents are very interested or somewhat interested in working as a data scientist, yet only 21% felt that their current program of study adequately prepares them for such a career.
  - b) Around 36% would definitely be interested in a BS in a Data Science degree if they were currently a high school student or college frosh/sophomore. An additional 43% would possibly be interested.
  - c) Around 50% would definitely encourage current high school students or college frosh/sophomores to consider applying to such a BS Data Science degree program. An additional 44% might do so.
  - d) 40% of respondents identify as female, about 79% are members of an ethnic minority group, and 45% are receiving financial aid.

Details of the survey could be found in Appendix A. 2b: Self-conducted Student Interest Survey

- **Equity and affordability.**
  - a) **Motivated by Implementation Grant to Increase Diversity, Equity, and Inclusiveness.** The goal of the Implementation Grant, administered by the Center for Inclusive Computing, is to support the implementation of evidence-based approaches that quickly and significantly increase the representation of women in undergraduate computing. Motivated by the Implementation Grant, the proposed BS in Data Science is computing-focused, and aims to apply the evidence-based approaches to successfully attract, retain, and graduate substantially more women and URM (Under-Represented Minorities) students.
  - b) **Data Science Education Helps Diversify the STEM Field.** Many people, including researchers and educators, believe that Data Science education can help diversify the STEM field. As of 2020, Data Science is accepted math coursework for University of California and Cal State University's A-G requirements. Furthermore, on September 24, 2021, U.S. Senators Cory Booker (D-NJ), Alex Padilla (D-Calif.), and Jeff Merkley (D-Ore.) led a group of colleagues in urging the Institute of Education Sciences (IES) and the National Science Foundation (NSF) to improve equity and access to high-quality K-12 data science education. In addition, they also urge the Congress to improve the support of development of data science curriculum to reach more communities and open doors to STEM careers.
  - c) **Providing an Affordable Data Science BS Degree to Increase Equity.** Currently, there is no BS in Data Science degree offered by any of CSU campuses. In the Bay Area, only the University of San Francisco offers a BS in Data Science degree and UC Berkeley offers BA in Data Science. The former consists of 56-units of major requirements at a charge



of \$1,885 per enrolled unit, with an annual tuition cost of \$52,920 on its Downtown San Francisco campus, and the latter is a BA (not BS) in Data Science program also consisting of 56-units of major requirements at a cost of \$14,254 annual tuition for California residents. Both programs are clearly very expensive. It is our vision that the Bay Area needs an affordable BS Data Science degree program, especially at the CSU level, which can serve low-income students from the region and beyond. We believe that the proposed program at SJSU, which only costs California residents \$7,852 per year if enrolling full time and costs a total of \$31,408 in tuition over four years, can address the urgent equity and affordability issue facing the data science field.

#### **4) Workforce demand projections and other relevant data.**

A number of reports and news articles over the past few years have accurately predicted the huge market demand for data scientists; we cite some examples below.

In 2011, McKinsey predicted that *“by 2018 there would be 2.8 million workers with either deep analytical talent or data-savvy skillsets”*.

A 2015 report completed jointly by Burning Glass Technologies, the Business-Higher Education Forum (BHEF), and IBM followed up on the McKinsey study and made a similar prediction:

*“By 2015, however, there were already over 2,350,000 job listings for core Data Science and Analytics (DSA) jobs in the United States, and by 2020 the number of DSA job listings is projected to grow by nearly 364,000 listings, to about 2,720,000 opening”*.

An online search for job listings on LinkedIn, Indeed, SimplyHired, Monster, and Angellist conducted by Jeff Hale on October 10, 2018 reported the following number of data scientist jobs each website listed:

A January 23, 2019 article at Forbes.com says that *“Data Scientist is the best job in America for the 4th year in a row with 6,510 open positions paying a median base salary of \$108,000”*.

#### **5) Student Demand**

We provide the following compelling evidence of student interest in the proposed program:

- **Employment forecasts.** Market demand for data scientists and advanced analysts has been very high according to various sources, a few examples of which have been given in Section 5e (workforce demand projection).
- **Student interest survey conducted at SJSU.** A questionnaire was designed and delivered via Google Form to all current undergraduate majors at SJSU to poll their interest in, and level of interest in pursuing a BS in data science degree. Below are some findings from the student survey:
  - About 73% of respondents are at least somewhat interested in working as a data scientist, yet only 21% felt that their current program of study adequately prepares them for such a career.
  - Around 36% would definitely be interested in a BS in a Data Science degree if they were currently a high school student or college frosh/sophomore. An additional 43% would possibly be interested.
  - Around 50% would definitely encourage current high school students or college frosh/sophomores to consider applying to such a BS Data Science degree program. An additional 44% might do so.
  - 40% of respondents identify as female and 79% are members of an ethnic minority group.

These numbers clearly indicate the strong interest of current SJSU students in the data science profession, while also revealing the inadequacy of their program coursework in preparing them for such a career.

One of the main reasons for introducing the proposed program is to address the affordability and equity issues in data science education. As already pointed out, the Bay Area lacks a full BS in Data Science program at the CSU level, which can better serve minority and low-income students. The proposed program will operate in regular session, and thus has a significant advantage in affordability.

Additionally, SJSU's student population is one of the most ethnically diverse in the nation. For example, according to the Student Interest Survey conducted to those majors at SJSU, over 70% of the respondents ethnically belong to a minority group.

The proposed program is designed to help people, who are interested in computer science related careers but not heavy hardware coursework, to pursue a data science career by providing them with a rigorous and affordable education in mathematics, statistics, computer science, and machine learning. Consequently, students and working professionals with such backgrounds and career goals can all benefit greatly from this program. Upon successful completion of the program, students can take on a number of data science positions, including but not limited to data scientist, data analyst, data mining specialist, machine learning engineer, and data and analytics manager.

**The Self-conducted Student Interest Survey is below:**

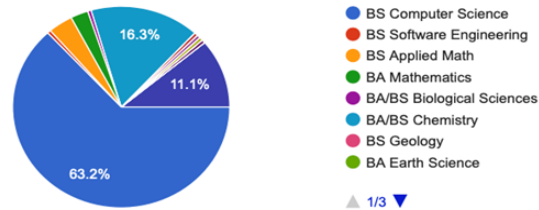


## BS Data Science Survey

190 responses

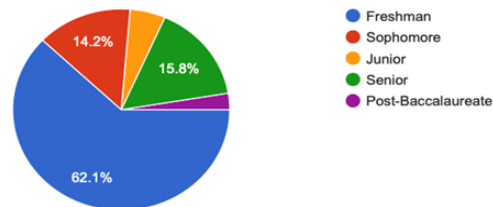
Please select your degree program at SJSU:

190 responses



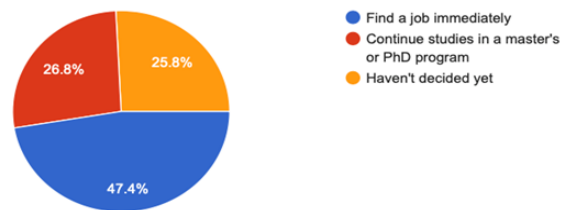
You are currently a

190 responses



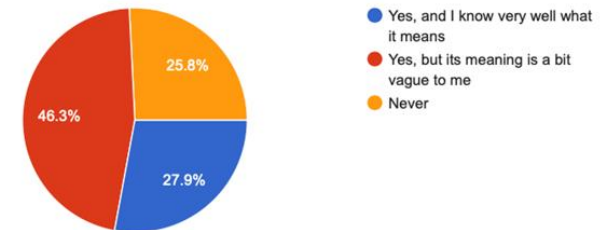
What is your plan right after graduation?

190 responses



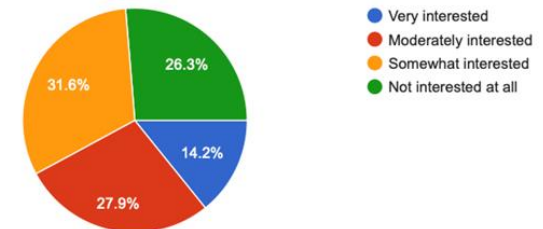
Have you heard about the new discipline called Data Science?

190 responses



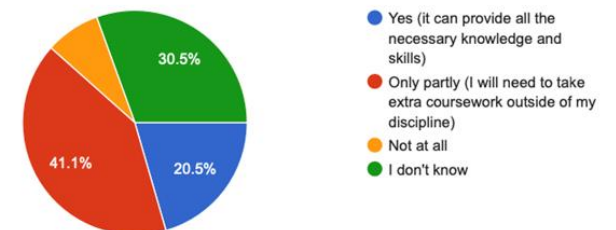
What is your level of interest in working as a data scientist?

190 responses



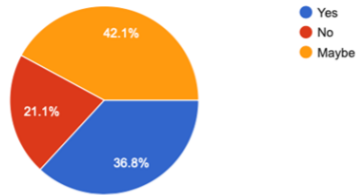
Do you think your current program coursework can adequately prepare you for a data science career?

190 responses



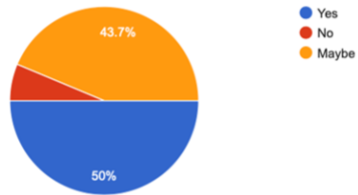
Would you be interested in a BS Data Science degree program if you were currently a high school student or college frosh/sophomore

190 responses



Would you encourage current high school students or college frosh/sophomores to consider applying to such a BS Data Science degree program?

190 responses



Do you have any other comments?

39 responses

no

N/A

No

nope

No.

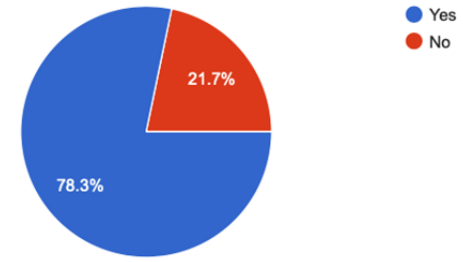
A data science degree would be great if it emphasizes on training students on how to conduct a research. Research experience will be a great advantage for seeking a career in data science.

not really

i mean what part of Data science? The current application is a lab tech which is hard to recommend as a career as it's not really the most interesting and being a specialist in

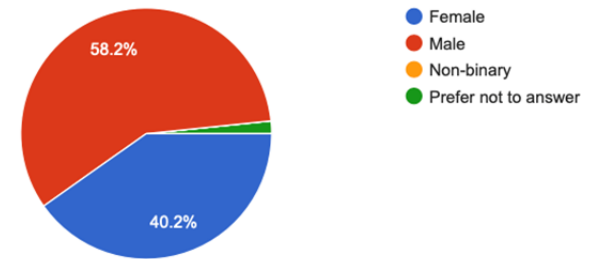
Are you ethnically in a minority group (e.g., African-Americans, Asians, Latinos, Native-Americans)?

184 responses



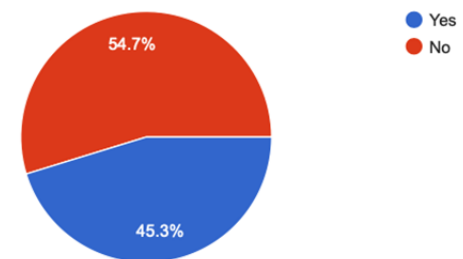
Gender: How do you identify?

184 responses



Are you currently receiving some kind of financial aid, or have received it during the past year?

179 responses



**B. Graduation Rates**

Computer Science											
<b>First-time Freshman 6-Year Graduation Rate</b>		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014				
Non-URM	cohort	48	67	80	39	48	10				
	grad count	30	42	59	32	36	8				
	grad rate	62.50%	62.70%	73.80%	82.10%	75.00%	80.00%				
URM	cohort	6	7	14	4	3	2				
	grad count	3	3	7	4	2	2				
	grad rate	50.00%	42.90%	50.00%	100.00%	66.70%	100.00%				
Total	cohort	54	74	94	43	51	12				
	grad count	33	45	66	36	38	10				
	grad rate	61.10%	60.80%	70.20%	83.70%	74.50%	83.30%				
<b>First-time Freshman 4-Year Graduation Rate</b>		Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016			
Non-URM	cohort	67	80	39	48	10	70	24			
	grad count	5	15	10	13	1	31	11			
	grad rate	7.50%	18.80%	25.60%	27.10%	10.00%	44.30%	45.80%			
URM	cohort	7	14	4	3	2	5				
	grad count	0	0	2	1	1	0				
	grad rate	0.00%	0.00%	50.00%	33.30%	50.00%	0.00%				
Total	cohort	74	94	43	51	12	75	24			
	grad count	5	15	12	14	2	31	11			
	grad rate	6.80%	16.00%	27.90%	27.50%	16.70%	41.30%	45.80%			
<b>Undergraduate Transfer 4-Year Graduation Rate</b>		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016		
Non-URM	cohort	26	34	30	36	27	29	29	28		
	grad count	16	24	28	29	23	24	26	23		
	grad rate	61.50%	70.60%	93.30%	80.60%	85.20%	82.80%	89.70%	82.10%		
URM	cohort	4	3	4	5	1	5	6	1		
	grad count	1	0	3	5	1	3	3	1		
	grad rate	25.00%	0.00%	75.00%	100.00%	100.00%	60.00%	50.00%	100.00%		
Total	cohort	30	37	34	41	28	34	35	29		
	grad count	17	24	31	34	24	27	29	24		
	grad rate	56.70%	64.90%	91.20%	82.90%	85.70%	79.40%	82.90%	82.80%		
<b>Undergraduate Transfer 2-Year Graduation Rate</b>		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort	26	34	30	36	27	29	29	28	52	83
	grad count	4	7	2	14	6	5	9	9	11	15
	grad rate	15.40%	20.60%	6.70%	38.90%	22.20%	17.20%	31.00%	32.10%	21.20%	18.10%
URM	cohort	4	3	4	5	1	5	6	1	7	10
	grad count	0	0	1	0	0	0	1	0	2	4
	grad rate	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	16.70%	0.00%	28.60%	40.00%
Total	cohort	30	37	34	41	28	34	35	29	59	93
	grad count	4	7	3	14	6	5	10	9	13	19
	grad rate	13.30%	18.90%	8.80%	34.10%	21.40%	14.70%	28.60%	31.00%	22.00%	20.40%

Graduate Student 2-Year Graduation Rate		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort	36	45	23	31	40	18	41	63	76	42
	grad count	9	21	19	27	25	4	32	50	60	24
	grad rate	25.00%	46.70%	82.60%	87.10%	62.50%	22.20%	78.00%	79.40%	78.90%	57.10%
URM	cohort	1								1	1
	grad count		0							0	0
	grad rate		0.00%							0.00%	0.00%
Total	cohort	36	46	23	31	40	18	41	63	77	43
	grad count	9	21	19	27	25	4	32	50	60	24
	grad rate	25.00%	45.70%	82.60%	87.10%	62.50%	22.20%	78.00%	79.40%	77.90%	55.80%

Graduate Student 4-Year Graduation Rate		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
Non-URM	cohort	36	45	23	31	40	18	41	63
	grad count	28	35	21	30	35	12	39	57
	grad rate	77.80%	77.80%	91.30%	96.80%	87.50%	66.70%	95.10%	90.50%
URM	cohort	1							
	grad count		0						
	grad rate		0.00%						
Total	cohort	36	46	23	31	40	18	41	63
	grad count	28	35	21	30	35	12	39	57
	grad rate	77.80%	76.10%	91.30%	96.80%	87.50%	66.70%	95.10%	90.50%

**College of Science**

First-time Freshman 6-Year Graduation Rate		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Non-URM	cohort	211	238	239	142	278	172
	grad count	120	152	152	113	195	142
	grad rate	56.90%	63.90%	63.60%	79.60%	70.10%	82.60%
URM	cohort	67	66	65	24	106	86
	grad count	26	31	35	16	65	49
	grad rate	38.80%	47.00%	53.80%	66.70%	61.30%	57.00%
Total	cohort	278	304	304	166	384	258
	grad count	146	183	187	129	260	191
	grad rate	52.50%	60.20%	61.50%	77.70%	67.70%	74.00%

First-time Freshman 4-Year Graduation Rate		Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
Non-URM	cohort	238	239	142	278	172	271	244
	grad count	25	26	30	45	35	76	67
	grad rate	10.50%	10.90%	21.10%	16.20%	20.30%	28.00%	27.50%
URM	cohort	66	65	24	106	86	99	133
	grad count	1	2	3	8	7	16	16
	grad rate	1.50%	3.10%	12.50%	7.50%	8.10%	16.20%	12.00%
Total	cohort	304	304	166	384	258	370	377
	grad count	26	28	33	53	42	92	83
	grad rate	8.60%	9.20%	19.90%	13.80%	16.30%	24.90%	22.00%

<b>Undergraduate Transfer 4-Year Graduation Rate</b>		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort	70	91	84	79	110	100	83	117	184	227
	grad count	44	62	69	58	80	74	66	83	37	45
	grad rate	62.90%	68.10%	82.10%	73.40%	72.70%	74.00%	79.50%	70.90%	20.10%	19.80%
URM	cohort	17	8	16	16	19	33	30	35	61	52
	grad count	8	2	11	12	13	17	18	27	9	7
	grad rate	47.10%	25.00%	68.80%	75.00%	68.40%	51.50%	60.00%	77.10%	14.80%	13.50%
Total	cohort	87	99	100	95	129	133	113	152	245	279
	grad count	52	64	80	70	93	91	84	110	46	52
	grad rate	59.80%	64.60%	80.00%	73.70%	72.10%	68.40%	74.30%	72.40%	18.80%	18.60%
<b>Undergraduate Transfer 2-Year Graduation Rate</b>											
		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort	70	91	84	79	110	100	83	117	162	103
	grad count	7	13	6	15	13	11	16	27	111	56
	grad rate	10.00%	14.30%	7.10%	19.00%	11.80%	11.00%	19.30%	23.10%	68.50%	54.40%
URM	cohort	17	8	16	16	19	33	30	35	16	20
	grad count	1	0	1	0	0	3	6	8	6	8
	grad rate	5.90%	0.00%	6.30%	0.00%	0.00%	9.10%	20.00%	22.90%	37.50%	40.00%
Total	cohort	87	99	100	95	129	133	113	152	178	123
	grad count	8	13	7	15	13	14	22	35	117	64
	grad rate	9.20%	13.10%	7.00%	15.80%	10.10%	10.50%	19.50%	23.00%	65.70%	52.00%
<b>Graduate Student 2-Year Graduation Rate</b>											
		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016		
Non-URM	cohort	73	120	127	137	107	94	148	121		
	grad count	19	41	46	65	62	39	85	79		
	grad rate	26.00%	34.20%	36.20%	47.40%	57.90%	41.50%	57.40%	65.30%		
URM	cohort	8	5	19	7	11	6	13	13		
	grad count	0	1	3	1	6	2	6	4		
	grad rate	0.00%	20.00%	15.80%	14.30%	54.50%	33.30%	46.20%	30.80%		
Total	cohort	81	125	146	144	118	100	161	134		
	grad count	19	42	49	66	68	41	91	83		
	grad rate	23.50%	33.60%	33.60%	45.80%	57.60%	41.00%	56.50%	61.90%		
<b>Graduate Student 4-Year Graduation Rate</b>											
		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016		
Non-URM	cohort	73	120	127	137	107	94	148	121		
	grad count	44	65	68	92	89	69	117	100		
	grad rate	60.30%	54.20%	53.50%	67.20%	83.20%	73.40%	79.10%	82.60%		
URM	cohort	8	5	19	7	11	6	13	13		
	grad count	1	1	7	4	8	3	7	11		
	grad rate	12.50%	20.00%	36.80%	57.10%	72.70%	50.00%	53.80%	84.60%		
Total	cohort	81	125	146	144	118	100	161	134		
	grad count	45	66	75	96	97	72	124	111		
	grad rate	55.60%	52.80%	51.40%	66.70%	82.20%	72.00%	77.00%	82.80%		



University Total												
<b>First-time Freshman 6-Year Graduation Rate</b>			Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014				
Non-URM	cohort		1,874	1,860	2,574	2,320	2,436	2,226				
	grad count		1,155	1,218	1,570	1,587	1,649	1,575				
	grad rate		61.60%	65.50%	61.00%	68.40%	67.70%	70.80%				
URM	cohort		747	837	1,283	980	1,208	1,170				
	grad count		333	456	619	555	673	652				
	grad rate		44.60%	54.50%	48.20%	56.60%	55.70%	55.70%				
Total	cohort		2,621	2,697	3,857	3,300	3,644	3,396				
	grad count		1,488	1,674	2,189	2,142	2,322	2,227				
	grad rate		56.80%	62.10%	56.80%	64.90%	63.70%	65.60%				
<b>First-time Freshman 4-Year Graduation Rate</b>			Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016			
Non-URM	cohort		1,860	2,574	2,320	2,436	2,226	2,180	1,892			
	grad count		231	304	361	400	485	604	622			
	grad rate		12.40%	11.80%	15.60%	16.40%	21.80%	27.70%	32.90%			
URM	cohort		837	1,283	980	1,208	1,170	1,149	1,173			
	grad count		71	85	110	129	170	235	256			
	grad rate		8.50%	6.60%	11.20%	10.70%	14.50%	20.50%	21.80%			
Total	cohort		2,697	3,857	3,300	3,644	3,396	3,329	3,065			
	grad count		302	389	471	529	655	839	878			
	grad rate		11.20%	10.10%	14.30%	14.50%	19.30%	25.20%	28.60%			
<b>Undergraduate Transfer 4-Year Graduation Rate</b>			Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort		1,077	1,423	1,550	1,515	1,791	1,770	1,687	2,016	2,240	2,047
	grad count		803	1,102	1,209	1,184	1,384	1,410	1,372	1,693	856	821
	grad rate		74.60%	77.40%	78.00%	78.20%	77.30%	79.70%	81.30%	84.00%	38.20%	40.10%
URM	cohort		358	477	567	610	778	853	810	988	1,170	1,067
	grad count		247	349	407	472	600	633	628	809	471	487
	grad rate		69.00%	73.20%	71.80%	77.40%	77.10%	74.20%	77.50%	81.90%	40.30%	45.60%
Total	cohort		1,435	1,900	2,117	2,125	2,569	2,623	2,497	3,004	3,410	3,114
	grad count		1,050	1,451	1,616	1,656	1,984	2,043	2,000	2,502	1,327	1,308
	grad rate		73.20%	76.40%	76.30%	77.90%	77.20%	77.90%	80.10%	83.30%	38.90%	42.00%
<b>Undergraduate Transfer 2-Year Graduation Rate</b>			Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016		
Non-URM	cohort		1,077	1,423	1,550	1,515	1,791	1,770	1,687	2,016		
	grad count		248	363	391	422	500	485	536	727		
	grad rate		23.00%	25.50%	25.20%	27.90%	27.90%	27.40%	31.80%	36.10%		
URM	cohort		358	477	567	610	778	853	810	988		
	grad count		75	98	130	189	243	253	289	400		
	grad rate		20.90%	20.50%	22.90%	31.00%	31.20%	29.70%	35.70%	40.50%		
Total	cohort		1,435	1,900	2,117	2,125	2,569	2,623	2,497	3,004		
	grad count		323	461	521	611	743	738	825	1,127		
	grad rate		22.50%	24.30%	24.60%	28.80%	28.90%	28.10%	33.00%	37.50%		

Graduate Student 2-Year Graduation Rate		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Non-URM	cohort	1,028	1,133	1,190	1,042	1,329	1,527	1,496	1,395	1,308	1,298
	grad count	453	500	572	555	832	1,018	1,025	930	834	826
	grad rate	44.10%	44.10%	48.10%	53.30%	62.60%	66.70%	68.50%	66.70%	63.80%	63.60%
URM	cohort	193	172	216	208	222	253	227	284	276	261
	grad count	101	80	96	101	118	125	114	179	161	153
	grad rate	52.30%	46.50%	44.40%	48.60%	53.20%	49.40%	50.20%	63.00%	58.30%	58.60%
Total	cohort	1,221	1,305	1,406	1,250	1,551	1,780	1,723	1,679	1,584	1,559
	grad count	554	580	668	656	950	1,143	1,139	1,109	995	979
	grad rate	45.40%	44.40%	47.50%	52.50%	61.30%	64.20%	66.10%	66.10%	62.80%	62.80%
Graduate Student 4-Year Graduation Rate		Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016		
Non-URM	cohort	1,028	1,133	1,190	1,042	1,329	1,527	1,496	1,395		
	grad count	848	894	946	859	1,164	1,362	1,323	1,202		
	grad rate	82.50%	78.90%	79.50%	82.40%	87.60%	89.20%	88.40%	86.20%		
URM	cohort	193	172	216	208	222	253	227	284		
	grad count	149	123	164	171	178	197	183	243		
	grad rate	77.20%	71.50%	75.90%	82.20%	80.20%	77.90%	80.60%	85.60%		
Total	cohort	1,221	1,305	1,406	1,250	1,551	1,780	1,723	1,679		
	grad count	997	1,017	1,110	1,030	1,342	1,559	1,506	1,445		
	grad rate	81.70%	77.90%	78.90%	82.40%	86.50%	87.60%	87.40%	86.10%		

Source: [http://www.iea.sjsu.edu/outcome/RetnGrad/grad\\_retn\\_dept.php](http://www.iea.sjsu.edu/outcome/RetnGrad/grad_retn_dept.php)

### C. Headcounts

Computer Science (source: <a href="http://www.iea.sjsu.edu/Courses/courses_by_department.php">http://www.iea.sjsu.edu/Courses/courses_by_department.php</a> )						
	# Sections	# Courses	Avg Sect Size	Seats Occup	Filled Rate	SCU
Spring 2022	140	55	24.9	3,483	78.5%	10,807
Fall 2021	136	54	28.7	3,897	83.6%	12,073
Spring 2021	120	51	30.2	3,623	88.1%	11,110
Fall 2020	139	52	29.3	4,078	86.7%	12,536
Spring 2020	111	51	30.3	3,366	89.40%	10,409
Fall 2019	107	48	30.4	3,249	92.10%	10,101
College of Science (source: <a href="http://www.iea.sjsu.edu/Courses/courses_by_college.php">http://www.iea.sjsu.edu/Courses/courses_by_college.php</a> )						
	# Sections	# Courses	Avg Sect Size	Seats Occup	Filled Rate	SCU
Spring 2022	889	339	22.4	19,871	76.2%	61,753
Fall 2021	879	341	26.7	23,502	80.3%	73,838
Spring 2021	833	340	24.3	20,281	76.4%	64,114
Fall 2020	861	332	26.9	23,141	78.8%	73,032
Spring 2020	777	343	26.7	20,729	76.7%%	64,556
Fall 2019	805	323	30	24,117	81.00%	74,250
University (source: <a href="http://www.iea.sjsu.edu/Courses/courses_by_year.php">http://www.iea.sjsu.edu/Courses/courses_by_year.php</a> )						
	# Sections	# Courses	Avg Sect Size	Seats Occup	Filled Rate	SCU
Spring 2022	5,551	2,459	20.5	113,888	72.1%	374,813
Fall 2021	5,772	2,555	22	126,721	71.2%	438,302
Spring 2021	5,541	2,556	21.1	116,970	68.20%	405,608
Fall 2020	5,617	2,492	22.6	127,070	70.50%	438,071
Spring 2020	5456	2,559	21.5	117,413	68.10%	401,279
Fall 2019	5476	2,446	23.4	127,974	71.30%	434,100

**D. ICLM (Induced Course Load Matrix)**

<Please copy the following data from the IEA website:

From [www.iea.sjsu.edu/Courses/default.cfm#Prefix](http://www.iea.sjsu.edu/Courses/default.cfm#Prefix), select your program

Exhibit 1 Number of Course Sections

Exhibit 2 Average Headcount per Section

Exhibit 3 FTES, Induced Load Matrix

Source:	<a href="http://ir.sjsu.edu/Courses/ICLM_college.php">http://ir.sjsu.edu/Courses/ICLM_college.php</a>	
Courses offered by Prefix: CS		

<b>ICLM Spring 2022</b>		
<b>Student Colleges</b>	<b>Student Major/Program (group)</b>	<b>FTEs</b>
Business	Accounting	0
Business	Business Analytics	2
Business	Corporate Accounting and Finance	1
Business	Entrepreneurship	1
Business	Finance	1
Business	General Business	1
Business	Global Operations Management	0
Business	Hospitality, Tourism and Event Management	0
Business	Human Resource Management	1
Business	Management	1
Business	Management Information Systems	6
Business	Marketing	1
Education	Child and Adolescent Development	0
Engineering	Aerospace Engineering	1
Engineering	Aviation	1
Engineering	Biomedical Engineering	2
Engineering	Chemical Engineering	0
Engineering	Civil Engineering	0
Engineering	Computer Engineering	4
Engineering	Electrical Engineering	2
Engineering	Engineering	1
Engineering	Engineering Technology	5
Engineering	Industrial Technology	1
Engineering	Industrial and Systems Engineering	2
Engineering	Interdisciplinary Engineering	1

Engineering	Mechanical Engineering	3
Engineering	Software Engineering	116
Health & Human Sciences	Kinesiology	1
Health & Human Sciences	Public Health	1
Humanities & the Arts	Advertising	0
Humanities & the Arts	Art	1
Humanities & the Arts	Art/Animation/Illustration	0
Humanities & the Arts	Creative Arts	0
Humanities & the Arts	Design Studies	1
Humanities & the Arts	English	0
Humanities & the Arts	Graphic Design	0
Humanities & the Arts	Humanities	0
Humanities & the Arts	Japanese	0
Humanities & the Arts	Linguistics	1
Humanities & the Arts	Music	0
Humanities & the Arts	Philosophy	0
Humanities & the Arts	Theatre Arts	0
Science	Applied Mathematics	28
Science	Bioinformatics	13
Science	Biological Science	5
Science	Chemistry	2
Science	Computer Science	482
Science	Data Science	13
Science	Mathematics	8
Science	Physics	2
Science	Statistics	1
Social Sciences	Anthropology	0
Social Sciences	Behavioral Science	1

Social Sciences	Communication Studies	1
Social Sciences	Economics	3
Social Sciences	Forensic Science	5
Social Sciences	Global Studies	1
Social Sciences	History	0
Social Sciences	Justice Studies	1
Social Sciences	Political Science	1
Social Sciences	Psychology	1
Undergraduate Studies	Undeclared	8
Courses offered by Prefix: CS		
ICLM Fall 2021		
Student Colleges	Student Major/Program (group)	FTEs
Business	Accounting	1
Business	Business Analytics	2
Business	Corporate Accounting and Finance	0
Business	Entrepreneurship	1
Business	Finance	1
Business	General Business	0
Business	Management	1
Business	Management Information Systems	4
Business	Marketing	1
Engineering	Aerospace Engineering	2
Engineering	Artificial Intelligence	0
Engineering	Aviation	1
Engineering	Biomedical Engineering	2
Engineering	Chemical Engineering	1
Engineering	Civil Engineering	0

Engineering	Computer Engineering	7
Engineering	Electrical Engineering	4
Engineering	Engineering	1
Engineering	Engineering Technology	4
Engineering	Industrial Technology	0
Engineering	Industrial and Systems Engineering	1
Engineering	Mechanical Engineering	2
Engineering	Software Engineering	140
Health & Human Sciences	Kinesiology	0
Health & Human Sciences	Public Health	1
Humanities & the Arts	Advertising	0
Humanities & the Arts	Art	1
Humanities & the Arts	Art/Animation/Illustration	1
Humanities & the Arts	Design Studies	2
Humanities & the Arts	English	0
Humanities & the Arts	Japanese	1
Humanities & the Arts	Linguistics	1
Humanities & the Arts	Music	1
Science	Applied Mathematics	32
Science	Bioinformatics	16
Science	Biological Science	12
Science	Chemistry	6
Science	Computer Science	531
Science	Data Science	12
Science	Marine Biology	0
Science	Mathematics	8
Science	Physics	0
Science	Statistics	3

Social Sciences	African American Studies	0
Social Sciences	Anthropology	0
Social Sciences	Behavioral Science	0
Social Sciences	Communication Studies	1
Social Sciences	Economics	2
Social Sciences	Environmental Studies	0
Social Sciences	Forensic Science	4
Social Sciences	Global Studies	1
Social Sciences	History	0
Social Sciences	Justice Studies	1
Social Sciences	Political Science	0
Social Sciences	Psychology	1
Social Sciences	Sociology	0
Undergraduate Studies	Undeclared	16
<b>Courses offered by Prefix: CS</b>		
<b>ICLM Spring 2021</b>		
<b>Student Colleges</b>	<b>Student Major/Program (group)</b>	<b>FTEs</b>
Business	Accounting	1
Business	Accounting Information Systems	0
Business	Business Analytics	2
Business	Corporate Accounting and Finance	0
Business	Entrepreneurship	1
Business	Finance	1
Business	General Business	0
Business	Human Resource Management	0
Business	Management	0
Business	Management Information Systems	4



<b>Business</b>	<b>Marketing</b>	<b>1</b>
<b>Engineering</b>	<b>Aerospace Engineering</b>	<b>2</b>
<b>Engineering</b>	<b>Aviation</b>	<b>1</b>
<b>Engineering</b>	<b>Biomedical Engineering</b>	<b>2</b>
<b>Engineering</b>	<b>Chemical Engineering</b>	<b>1</b>
<b>Engineering</b>	<b>Civil Engineering</b>	<b>0</b>
<b>Engineering</b>	<b>Computer Engineering</b>	<b>3</b>
<b>Engineering</b>	<b>Electrical Engineering</b>	<b>2</b>
<b>Engineering</b>	<b>Engineering</b>	<b>1</b>
<b>Engineering</b>	<b>Industrial Technology</b>	<b>1</b>
<b>Engineering</b>	<b>Industrial and Systems Engineering</b>	<b>1</b>
<b>Engineering</b>	<b>Interdisciplinary Engineering</b>	<b>1</b>
<b>Engineering</b>	<b>Materials Engineering</b>	<b>0</b>
<b>Engineering</b>	<b>Mechanical Engineering</b>	<b>4</b>
<b>Engineering</b>	<b>Software Engineering</b>	<b>121</b>
<b>Health &amp; Human Sciences</b>	<b>Kinesiology</b>	<b>0</b>
<b>Health &amp; Human Sciences</b>	<b>Public Health</b>	<b>1</b>
<b>Humanities &amp; the Arts</b>	<b>Art</b>	<b>1</b>
<b>Humanities &amp; the Arts</b>	<b>Art, Animation/Illustration</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Creative Arts</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Design Studies</b>	<b>2</b>
<b>Humanities &amp; the Arts</b>	<b>English</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Graphic Design</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Humanities</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Japanese</b>	<b>1</b>
<b>Humanities &amp; the Arts</b>	<b>Liberal Studies</b>	<b>0</b>
<b>Humanities &amp; the Arts</b>	<b>Linguistics</b>	<b>1</b>
<b>Humanities &amp; the Arts</b>	<b>Music</b>	<b>1</b>

Humanities & the Arts	Philosophy	0
Humanities & the Arts	Radio-Television-Film	0
Science	Applied Mathematics	27
Science	Bioinformatics	17
Science	Biological Science	14
Science	Chemistry	6
<b>Science</b>	<b>Computer Science</b>	<b>498</b>
Science	Data Science	6
Science	Earth Science	0
Science	Ecology and Evolution	1
Science	Marine Biology	0
Science	Mathematics	5
Science	Physics	1
Science	Statistics	2
Social Sciences	Communication Studies	0
Social Sciences	Economics	3
Social Sciences	Environmental Studies	0
Social Sciences	Forensic Science	3
Social Sciences	Global Studies	1
Social Sciences	History	1
Social Sciences	Justice Studies	0
Social Sciences	Political Science	0
Social Sciences	Psychology	1
Social Sciences	Sociology	1
Undergraduate Studies	Undeclared	12
<b>Courses offered by Prefix: CS</b>		
<b>ICLM Fall 2020</b>		

<b>Student Colleges</b>	<b>Student Major/Program (group)</b>	<b>FTEs</b>
Business	Accounting	0
Business	Accounting Information Systems	1
Business	Business Analytics	1
Business	Corporate Accounting and Finance	0
Business	Entrepreneurship	1
Business	Finance	0
Business	General Business	1
Business	Global Operations Management	1
Business	International Business	0
Business	Management	0
Business	Management Information Systems	5
Business	Marketing	1
Engineering	Aerospace Engineering	1
Engineering	Biomedical Engineering	1
Engineering	Chemical Engineering	2
Engineering	Civil Engineering	1
Engineering	Computer Engineering	5
Engineering	Electrical Engineering	4
Engineering	Engineering	1
Engineering	Industrial Technology	3
Engineering	Industrial and Systems Engineering	0
Engineering	Interdisciplinary Engineering	1
Engineering	Materials Engineering	0
Engineering	Mechanical Engineering	3
Engineering	Software Engineering	154
Health & Human Sciences	Public Health	0
Humanities & the Arts	Advertising	0

Humanities & the Arts	Art	1
Humanities & the Arts	Art, Animation/Illustration	1
Humanities & the Arts	Creative Arts	0
Humanities & the Arts	Design Studies	2
Humanities & the Arts	English	0
Humanities & the Arts	Graphic Design	0
Humanities & the Arts	Industrial Design	0
Humanities & the Arts	Japanese	1
Humanities & the Arts	Linguistics	2
Humanities & the Arts	Music	0
Humanities & the Arts	Radio-Television-Film	0
Humanities & the Arts	Spanish	0
Science	Applied Mathematics	35
Science	Bioinformatics	16
Science	Biological Science	11
Science	Chemistry	4
Science	Computer Science	558
Science	Data Science	2
Science	Ecology and Evolution	1
Science	Mathematics	10
Science	Meteorology	0
Science	Physics	1
Science	Statistics	2
Social Sciences	African American Studies	0
Social Sciences	Communication Studies	1
Social Sciences	Economics	2
Social Sciences	Forensic Science	2
Social Sciences	Geography	0

<b>Social Sciences</b>	<b>Global Studies</b>	<b>0</b>
<b>Social Sciences</b>	<b>History</b>	<b>0</b>
<b>Social Sciences</b>	<b>Justice Studies</b>	<b>1</b>
<b>Social Sciences</b>	<b>Organizational Studies</b>	<b>0</b>
<b>Social Sciences</b>	<b>Psychology</b>	<b>1</b>
<b>Social Sciences</b>	<b>Sociology</b>	<b>0</b>
<b>Social Sciences</b>	<b>Urban Planning</b>	<b>0</b>
<b>Undergraduate Studies</b>	<b>Undeclared</b>	<b>11</b>

**E. SFR (Student to Faculty Ratio)**

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric  
Student to Faculty Ratio (SFR)

Year  
2016

Term  
Fall

	Tenured	Probationary	Temporary	Others	Total
All University				3.4	3.4
Business	33.3	30.7	43.9		38.5
Education	19.2	20.3	23.3	1	21.7
Engineering	29	32.3	37	11.8	32.7
Health & Human Sciences	19.6	21.5	21.4	23.7	21
Humanities & the Arts	19.2	16.5	24.4	21.1	22.2
Professional & Global Edu	12.5	19.1	21.8		18.5
Science	22.5	22.3	35	17.9	26
Social Sciences	21.6	19.5	31	24.5	26.9
Undergraduate Studies			6	16.8	15.9
<b>Unduplicated Total</b>	<b>22.5</b>	<b>22.6</b>	<b>29.4</b>	<b>14.8</b>	<b>25.8</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric  
Student to Faculty Ratio (SFR)

Year  
2017

Term  
Spring

	Tenured	Probationary	Temporary	Others	Total
All University				3.2	3.2
Business	31.5	30	43.3		37.4
Education	17	18.4	21.3		19.9
Engineering	27.5	30.6	33.8	12.3	30.7
Health & Human Sciences	18.4	20.5	20.8	23.7	20.3
Humanities & the Arts	18	13.9	22.9	17.7	20.6
Professional & Global Edu	12	15.9	22.6	3.8	17.8
Science	21.5	17.8	30.4	16.4	23
Social Sciences	20.9	19.7	28.6	23.3	25.4
Undergraduate Studies			30.8	16.2	23
<b>Unduplicated Total</b>	<b>21.3</b>	<b>20.7</b>	<b>27.3</b>	<b>14</b>	<b>24.1</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2017 Term Fall

	Tenured	Probationary	Temporary	Others	Total
All University				3.7	3.7
Business	31.9	32.7	45.6		38.9
Education	18.1	23.4	23.1		21.9
Engineering	30.8	32.4	34.7	13.7	31.9
Health & Human Sciences	21.5	22.1	23.2	25.5	22.7
Humanities & the Arts	19.4	15.7	24.6	19.7	22.4
Professional & Global Edu	13.7	17.3	21.5	23.8	19
Science	23.2	22.7	36	20.6	26.9
Social Sciences	23.5	21.7	31.4	24	27.7
Undergraduate Studies				11.1	11.1
<b>Unduplicated Total</b>	<b>23.5</b>	<b>23.7</b>	<b>29.6</b>	<b>16.5</b>	<b>26.3</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2018 Term Spring

	Tenured	Probationary	Temporary	Others	Total
All University			0.3	3.4	3.3
Business	30.7	31.3	42.9		36.9
Education	16	21.3	22	17.8	20.5
Engineering	28.4	30.9	32.8	10.8	30.3
Health & Human Sciences	20.1	20.9	23.2	23	22.2
Humanities & the Arts	17.6	15.5	22.6	19.1	20.6
Professional & Global Edu	12.7	18	28.3		22.4
Science	23.2	17.3	33.8	17.3	24.8
Social Sciences	21.5	21.7	30.3	19.4	26.6
Undergraduate Studies			28	17.4	21.6
<b>Unduplicated Total</b>	<b>22.1</b>	<b>22</b>	<b>28.1</b>	<b>14.6</b>	<b>24.9</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2018 Term Fall

	Tenured	Probationary	Temporary	Others	Total
All University				3.2	3.2
Business	32.2	32.7	44.3		38.2
Education	18	18.5	23.2	17.6	21.3
Engineering	27.6	30.8	33.3	11.5	30.4
Health & Human Sciences	22.1	21.1	21.4	24.9	21.5
Humanities & the Arts	18.2	15.5	24.1	21.8	21.8
Professional & Global Edu	12.5	19.8	24.2	21	20.7
Science	23.8	23.3	36.4	14.3	26.5
Social Sciences	23.3	21.8	31.5	25.7	27.7
Undergraduate Studies			22.6	11.3	19
<b>Unduplicated Total</b>	<b>23.2</b>	<b>22.9</b>	<b>28.9</b>	<b>13.9</b>	<b>25.7</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2019 Term Spring

	Tenured	Probationary	Temporary	Others	Total
All University				2.9	2.9
Business	31	31.2	43.5		37.4
Education	18.4	18.2	20.4		19.6
Engineering	29.2	29.9	30.8	12	29.2
Health & Human Sciences	20.2	20.6	21.8	31.7	21.4
Humanities & the Arts	16.7	14.8	22.2	19.9	20.2
Professional & Global Edu	12	24.5	24.4	16.3	21
Science	22	17.8	32.8	14.5	24.1
Social Sciences	22.3	20.3	29.9	19.5	26.3
Undergraduate Studies			22.2	16.3	20.3
<b>Unduplicated Total</b>	<b>22.3</b>	<b>21.2</b>	<b>27.3</b>	<b>13.6</b>	<b>24.4</b>



## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2019 Term Fall

	Tenured	Probationary	Temporary	Others	Total
All University				3.5	3.5
Business	27.7	30.8	46.2		36.2
Education	17.1	21	22.4		20.7
Engineering	25.5	23.6	33.5	8.4	28
Health & Human Sciences	16.5	19.6	23.2	27.6	21.5
Humanities & the Arts	15.3	13.8	25.6	23	21.8
Professional & Global Edu	5.9	12	27		14.2
Science	25	20.5	36.9	16.2	27.7
Social Sciences	22	17.5	32.7	25.2	27.5
Undergraduate Studies			19.4		19.4
<b>Unduplicated Total</b>	<b>21</b>	<b>19.8</b>	<b>30.1</b>	<b>14.4</b>	<b>25.3</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric Student to Faculty Ratio (SFR) Year 2020 Term Spring

	Tenured	Probationary	Temporary	Others	Total
All University				3.4	3.4
Business	31.7	33.2	44.3	25.5	38
Education	17.2	17.8	21.5		20
Engineering	27.8	23.9	29.3	11	27.1
Health & Human Sciences	17.3	23.5	20.3	26.7	20.5
Humanities & the Arts	15.5	14.2	22.3	21.7	19.9
Professional & Global Edu	20.6	21	27.2	22.1	24.3
Science	19.2	18.5	33.5	15.3	24.3
Social Sciences	20.5	18	30.3	24.2	26.2
Undergraduate Studies			19.4	27	20.3
<b>Unduplicated Total</b>	<b>20.7</b>	<b>20.6</b>	<b>27.1</b>	<b>14.6</b>	<b>24</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric	Year				Term
Student to Faculty Ratio (SFR)	2020				Fall
	Tenured	Probationary	Temporary	Others	Total
All University				3.4	3.4
Business	24.6	20.1	46.1	35	32.2
Education	14.6	14.6	23.6		19
Engineering	17.7	15.7	31.2	11.6	23.1
Health & Human Sciences	13.8	15.9	22.6	33.6	19.5
Humanities & the Arts	13.4	12.2	24.4	28.6	20.1
Professional & Global Edu	4.2	5.6	27.7		13
Science	17.5	14.5	34.1	18.6	22.5
Social Sciences	18.6	14.9	33.3	25.7	25.8
Undergraduate Studies			46.8		46.8
<b>Unduplicated Total</b>	<b>16.8</b>	<b>15</b>	<b>29.5</b>	<b>16.8</b>	<b>22.6</b>

## Instructional Faculty by College

Definitions

Data Source: APDB Faculty  
Session: State-Supported

Metric	Year				Term
Student to Faculty Ratio (SFR)	2021				Spring
	Tenured	Probationary	Temporary	Others	Total
All University				3.3	3.3
Business	31	33.5	43		37.2
Education	17.2	20.8	22.4		21
Engineering	22.1	22.9	27.4	12.1	24.6
Health & Human Sciences	17.4	19	20.6	32.8	20
Humanities & the Arts	15.5	16.5	21.3	22.7	19.6
Professional & Global Edu	28.7	20.5	27.6		26.7
Science	18.8	17.3	32.8	16.5	23.5
Social Sciences	20.3	19.3	30.2	24.9	26.1
Undergraduate Studies			18	18.3	18
<b>Unduplicated Total</b>	<b>20.3</b>	<b>20.4</b>	<b>26.7</b>	<b>15</b>	<b>23.6</b>

Exhibit 4 Induced Course Load Matrix

From [www.iea.sjsu.edu/Assessment/ProgRev/default.cfm](http://www.iea.sjsu.edu/Assessment/ProgRev/default.cfm), select your program

Exhibit 5 Applied, Admitted, Enrolled

Exhibit 6 Enrollment by Class Level with FTES

Exhibit 7 Enrollment by Major and Concentration

Exhibit 8 Degrees Awarded

From [www.iea.sjsu.edu/RetnGrad/default.cfm#Prefix](http://www.iea.sjsu.edu/RetnGrad/default.cfm#Prefix), select your program

Exhibit 9 First Year Retention Rates

Exhibit 10 Graduation Rates

Also calculate T/TT instructional faculty percentage. From [www.iea.sjsu.edu/Faculty/default.cfm#Dept](http://www.iea.sjsu.edu/Faculty/default.cfm#Dept), select your department. Under “Instructional Faculty – FTEF”, select “by Tenure Status”. Add together “Tenured” and “Probationary” numbers, and divide sum by “Total”.

#### **F. GE Assessment**

1. [CS100W GE Assessment AY15 16](#)
2. [CS100W GE Assessment AY16 17](#)
3. [CS100W GE Assessment AY17 18](#)
4. [CS100W GE Assessment AY18 19](#)
5. [CS100W GE Assessment AY19 20](#)
6. [CS100W GE Assessment AY20 21](#)