



SJSU CATALOG
Academic Year 2016-2017
ADDENDUM

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Contents

General Education and American Institutions Letter Designation Attributes	3
Biological Sciences Department	4
Biomedical, Chemical and Materials Engineering Department	20
Business.....	24
Mathematics and Statistics Department	34
Mechanical Engineering Department.....	38
Meteorology and Climate Science Department.....	41
Psychology Department	44
Social Work Program.....	47

Academic Year 2016-2017 ADDENDUM Departments & Degrees

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

For more information about General Education Objectives visit the policies and procedure pages in this catalog.

A1.....	Area A1: Oral Communication
A2.....	Area A2: Written Communication IA
A3.....	Area A3: Critical Thinking
B1.....	Area B1: Physical Science
B1+B3.....	Area B1+B3: Physical Science & Lab Sci
B2.....	Area B2: Life Science
B2+B3.....	Area B2+B3: Life Science & Lab Sci
B3.....	Area B3: Laboratory Science
B4.....	Area B4: Mathematical Concepts
C1.....	Area C1: Arts
C2.....	Area C2: Letters
D1.....	Area D1: Human Behavior
D2.....	Area D2: Comparative Systems
D2+D3*	Area D2+D3 Comp Sys & Soc Iss
D3.....	Area D3: Social Issues
E.....	Area E: Human Understanding & Development
US1.....	Area US1: American History
US2+US3*	Area US2, US3: US Constitution & California Government
US3.....	Area US3: California Government Only
US1+US2+US3*	Multiple GE Areas: US1, 2, 3
M1*	Multiple GE Areas: A1; C2; US1, 2, 3
M2*	Multiple GE Areas: A2; C2
M3*	Multiple GE Areas: A1; D2
M4*	Multiple GE Areas: C1; D2
M5*	Multiple GE Areas: C2; D3; US1, 2, 3
M6*	Multiple GE Areas: D2; US1, 2, 3
M7*	Multiple GE Areas: D3; US1, 2, 3
M8*	Multiple GE Areas: C1; C2
M9*	Multiple GE Areas: A3 or C2
M10*	Multiple GE Areas: A2; D3
M11*	Multiple GE Areas: D3; US2, 3
M12*	Multiple GE Areas: D2; US1
M13*	Multiple GE Areas: A3; C2; US1, 2, 3
M14*	Multiple GE Areas: A1; D2
M15*	Multiple GE Areas: A2; D3
R.....	Area R: Earth & Environment
S.....	Area S: Self, Society & Equality in the U.S.
V.....	Area V: Culture, Civilization & Global Understanding
Z.....	Area Z: Written Communication II (GWAR)

* In some cases the GE area may not be met until the entire course sequence is completed. This also applies to other GE combinations not noted with an asterisk.

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Biological Sciences Department

College of Science

The following changes were made to the Biological Science undergraduate degree programs. The degree requirements for the Bachelor of Arts and Bachelor of Science degrees are updated in the degree templates below.

Removal of the following requirement:

Major-Specific Graduation Requirements

Students in this major must complete all lower division courses in the Requirements of the Major with a "C- or better" to graduate.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BA - Biological Science

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of "C or better" (C- not accepted).

University Graduation Requirements 38

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS (EXCEPT FOR 1 COURSE IN GE AREA C AND 1 COURSE IN GE AREA D) AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP (WHICH INCLUDE THE MISSING GE IN AREA C AND D). MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies 6

- AFAM 002A. African-Americans and the Development of America's History and Government..... D2..... 3
- AFAM 002B. African-Americans and the Development of America's History and Government..... M7..... 3

Asian American Studies 6

- AAS 033A. Asian Americans in U.S. History I..... D2..... 3
- AAS 033B. Asian Americans in U.S. History II..... M7..... 3

U.S. History and Government 6

- HIST 015A. Essentials of U.S. History M12 3
 - HIST 015B. Essentials of U.S. & California Government M11 3
- Can be taken as POLS 015 A/B as well.*

Mexican American Studies 6

- MAS 010A. Mexican Americans and the Development of U.S. History and Government D2..... 3
- MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7..... 3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gvar.html .	
<i>A grade of ""C or better"" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	35-41
BIOL 055. Introductory Biostatistics	B4 .....3
BIOL 100W. Scientific Communication Workshop	Z .....3
CHEM 001A. General Chemistry.....	B1+B3 .....5
CHEM 001B. General Chemistry.....	B1+B3 .....5
PHYS 002A. Fundamentals of Physics	B1+B3 .....4
PHYS 002B. Fundamentals of Physics.....	B1+B3 .....4
COMPLETE ONE SEQUENCE FROM:	
Organic Chemistry A	
CHEM 008. Organic Chemistry.....	3
CHEM 009. Organic Chemistry Lab.....	1
Organic Chemistry B	
CHEM 112A. Organic Chemistry.....	3
CHEM 112B. Organic Chemistry.....	3
CHEM 113A. Organic Chemistry Lab.....	2
COMPLETE ONE COURSE FROM:	
CHEM 132. Introductory Biochemistry.....	4
CHEM 135. General Biochemistry	4
COMPLETE ONE COURSE FROM:	
MATH 019. Precalculus.....	B4 .....5
MATH 030. Calculus I.....	B4 .....3
Requirements of the Major	36-38
Core Courses	14-16
BIOL 030. Principles of Biology I.....	B2+B3 .....4
BIOL 031. Principles of Biology II	B2+B3 .....4
BIOL 115. General Genetics	4
COMPLETE ONE COURSE FROM:	
BIOL 135B. Eukaryotic Cell and Molecular Biology II.....	R.....3
BIOL 160. Ecology.....	R.....4
BIOL 178. Integrative Physiology.....	R.....3
MICR 127. Microbial Physiology.....	R.....2
Major Electives	26-31
Upper Division Non-GE BIOL/BOT/ENT/ZOOL/MICR/MS Courses.....	16
Additional Electives (6 units must be upper division science, 3 units may be GE).....	10-15
Total Units Required	120

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Biological Science, Concentration in Ecology and Evolution

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of "C or better" (C- not accepted).

University Graduation Requirements 38

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS (EXCEPT FOR 1 COURSE IN GE AREA C AND 1 COURSE IN GE AREA D) AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP (WHICH INCLUDE THE MISSING GE IN AREA C AND D). MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies 6

- AFAM 002A. African-Americans and the Development of America's History and Government..... D2..... 3
- AFAM 002B. African-Americans and the Development of America's History and Government..... M7..... 3

Asian American Studies 6

- AAS 033A. Asian Americans in U.S. History I..... D2..... 3
- AAS 033B. Asian Americans in U.S. History II..... M7..... 3

U.S. History and Government 6

- HIST 015A. Essentials of U.S. History M12 3
 - HIST 015B. Essentials of U.S. & California Government M11 3
- Can be taken as POLS 015 A/B as well.*

Mexican American Studies 6

- MAS 010A. Mexican Americans and the Development of U.S. History and Government D2..... 3
- MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7..... 3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gwar.html .	
<i>A grade of ""C or better"" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	31
CHEM 001A. General Chemistry.....	B1+B3 .....5
CHEM 001B. General Chemistry.....	B1+B3 .....5
CHEM 008. Organic Chemistry.....	.....3
CHEM 009. Organic Chemistry Lab.....	.....1
BIOL 100W. Scientific Communication Workshop.....	Z.....3
BIOL 156. Ecological Sampling Design and Analyses.....	.....3
PHYS 002A. Fundamentals of Physics.....	B1+B3 .....4
PHYS 002B. Fundamentals of Physics.....	B1+B3 .....4
COMPLETE ONE COURSE FROM:	
MATH 030. Calculus I.....	B4 .....3
BIOL 055. Introductory Biostatistics.....	B4 .....3
Requirements of the Major	51
Core Courses	44
BIOL 030. Principles of Biology I.....	B2+B3 .....4
BIOL 031. Principles of Biology II.....	B2+B3 .....4
BIOL 106. Physiological Ecology.....	.....3
BIOL 106L. Physiological Ecology Lab.....	.....1
BIOL 113. Comparative Taxonomy.....	.....3
BIOL 114. Functional Morphology.....	.....3
BIOL 115. General Genetics.....	.....4
BIOL 118. Evolutionary Genetics.....	.....3
BIOL 160. Ecology.....	R.....4
BIOL 163. Conservation Biology.....	.....3
BOT 165. Plant Communities of California.....	.....4
ENT 101. Insect Diversity.....	.....4
COMPLETE ONE COURSE FROM:	
ZOOL 115. Invertebrate Zoology and Natural History.....	.....4
ZOOL 116. Vertebrate Evolution and Natural History.....	.....4
Major Electives	7
COMPLETE 7 UNITS FROM:	
BIOL 155. Hypothesis Testing.....	.....3
BIOL 164. Conservation and Management Techniques.....	.....3
BIOL 172. Ecology of Inland and Estuarine Waters.....	.....4
BIOL 180. Individual Studies.....	1-4.....
BOT 104. Plant Taxonomy.....	.....4
ENT 106. Forensic Entomology.....	.....3
GEOL 137. Introduction to GPS/GIS for Geologic Applications.....	.....4
ZOOL 115. Invertebrate Zoology and Natural History.....	.....4
ZOOL 116. Vertebrate Evolution and Natural History.....	.....4
<i>ZOOL 115 and ZOOL 116 (which ever wasn't taken above)</i>	

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

ZOOL 150. Fishery Conservation and Management	3
ZOOL 160. Zoogeography.....	3
Other upper-division non-GE BIOL/BOT/ENT/ZOOL/MICR/MS electives with prior advisor approval	

Total Units Required

120

Students must obtain a prior advisor approval for electives and for choice of courses within categories.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Biological Science, Concentration in Marine Biology

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of ""C or better"" (C- not accepted).

University Graduation Requirements 35

Core Lower Division General Education 21

Of the 39 units required by the university, 18 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies 6

- AFAM 002A. African-Americans and the Development of America's History and Government..... D2..... 3
- AFAM 002B. African-Americans and the Development of America's History and Government..... M7..... 3

Asian American Studies 6

- AAS 033A. Asian Americans in U.S. History I..... D2..... 3
- AAS 033B. Asian Americans in U.S. History II..... M7..... 3

U.S. History and Government 6

- HIST 015A. Essentials of U.S. History M12 3
- HIST 015B. Essentials of U.S. & California Government M11 3
- Can be taken as POLS 015 A/B as well.*

Mexican American Studies 6

- MAS 010A. Mexican Americans and the Development of U.S. History and Government D2..... 3
- MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7..... 3

Physical Education 2

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gwar.html>.

A grade of ""C or better"" (C- not accepted) is required to meet graduation requirement.

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Preparation for the Major		34
BIOL 055. Introductory Biostatistics	B4	3
BIOL 100W. Scientific Communication Workshop	Z	3
BIOL 156. Ecological Sampling Design and Analyses		3
CHEM 001A. General Chemistry	B1+B3	5
CHEM 001B. General Chemistry	B1+B3	5
CHEM 008. Organic Chemistry		3
CHEM 009. Organic Chemistry Lab		1
CHEM 132. Introductory Biochemistry		4
MATH 030. Calculus I	B4	3
PHYS 002A. Fundamentals of Physics	B1+B3	4
Requirements of the Major		51
BIOL 030. Principles of Biology I	B2+B3	4
BIOL 031. Principles of Biology II	B2+B3	4
BIOL 113. Comparative Taxonomy		3
BIOL 114. Functional Morphology		3
BIOL 115. General Genetics		4
BIOL 118. Evolutionary Genetics		3
BIOL 106. Physiological Ecology		3
BIOL 106L. Physiological Ecology Lab		1
BIOL 160. Ecology	R	4
MS 103. Marine Ecology		4
MS 144. Biological Oceanography		4
COMPLETE 14 UNITS FROM:		
BIOL 180. Individual Studies		1-3
GEOL 137. Introduction to GPS/GIS for Geologic Applications		4
ZOOL 115. Invertebrate Zoology and Natural History		4
ZOOL 116. Vertebrate Evolution and Natural History		4
MS 104. Quantitative Marine Science		4
MS 105. Marine Science Diving		3
MS 112. Marine Birds and Mammals		4
MS 113. Marine Ichthyology		4
MS 124. Marine Invertebrate Zoology I		4
MS 131. Marine Botany		4
MS 180. Independent Studies		1-3
Other upper-division non-GE BIOL/BOT/ZOOL/MICR/MS electives with prior advisor approval		
Total Units Required		120

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

BS - Biological Science, Concentration in Microbiology

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of "C or better" (C- not accepted).

University Graduation Requirements	38
Core Lower Division General Education	24
Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.	
NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS (EXCEPT FOR 1 COURSE IN GE AREA C AND 1 COURSE IN GE AREA D) AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP (WHICH INCLUDE THE MISSING GE IN AREA C AND D). MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.	
Upper Division General Education	6
Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.	
American Institutions	6
Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.	
COMPLETE ONE SEQUENCE FROM:	
African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3
Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3
U.S. History and Government	6
HIST 015A. Essentials of U.S. History	M12..... 3
HIST 015B. Essentials of U.S. & California Government	M11..... 3
<i>Can be taken as POLS 015 A/B as well.</i>	
Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government	D2..... 3
MAS 010B. Mexican Americans and the Development of U.S. History and Government.....	M7..... 3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gwar.html .	
<i>A grade of "C or better" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	17
BIOL 055. Introductory Biostatistics	B4 .....3
BIOL 100W. Scientific Communication Workshop	Z .....3
PHYS 002A. Fundamentals of Physics	B1+B3 .....4
PHYS 002B. Fundamentals of Physics.....	B1+B3 .....4
MATH 030. Calculus I.....	B4 .....3
<i>NOTE: MATH 030P (5 units) or MATH 060 (5 units) or Calculus A/B or B/C Advanced Placement Exam with a score of 3 or higher is also acceptable</i>	
Requirements of the Major	42
BIOL 030. Principles of Biology I	B2+B3 .....4
BIOL 031. Principles of Biology II.....	B2+B3 .....4
BIOL 107. Immunology.....	3
BIOL 115. General Genetics	4
MICR 101. General Microbiology.....	4
MICR 127. Microbial Physiology.....	R .....2
MICR 141. Pathogenic Microbiology I.....	3
COMPLETE AT LEAST 7 UNITS OF LABORATORY COURSES FROM:	
BIOL 107L. Immunology Laboratory	1
BIOL 116L. Genetics Laboratory.....	3
BIOL 180. Individual Studies.....	1-3
MICR 122L. Bacterial Diversity Laboratory.....	2
MICR 123L. Food Microbiology Laboratory.....	2
MICR 127L. Microbial Physiology Laboratory.....	2
MICR 140L. Hematology Laboratory.....	2
MICR 141L. Pathogenic Microbiology I - Laboratory.....	3
MICR 142L. Pathogenic Microbiology II - Laboratory.....	3
COMPLETE 11 ADDITIONAL UNITS FROM LAB COURSES ABOVE OR:	
BIOL 116. Molecular Genetics	3
BIOL 118. Evolutionary Genetics	3
BIOL 124. Systems Physiology.....	3
BIOL 125. Systems Physiology Laboratory.....	2
BIOL 134. Vertebrate Histology	4
BIOL 135A. Eukaryotic Cell and Molecular Biology I.....	3
BIOL 135L. Molecular Cell Biology Lab.....	2
BIOL 156. Ecological Sampling Design and Analyses	3
CHEM 055. Quantitative Analysis	2
CHEM 055L. Quantitative Analysis Laboratory.....	2
MICR 122. Bacterial Diversity	2
MICR 123. Food Microbiology.....	1
MICR 140. Hematology	3
MICR 142. Pathogenic Microbiology II.....	3
MICR 166. Bacterial Genetics.....	3
MICR 170. General Virology	3

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Requirements in the Minor		23
CHEM 001A. General Chemistry.....	B1+B3	5
CHEM 001B. General Chemistry.....	B1+B3	5
CHEM 112A. Organic Chemistry.....		3
CHEM 112B. Organic Chemistry.....		3
CHEM 113A. Organic Chemistry Lab.....		2
CHEM 120S. Chemical Safety Seminar		1
CHEM 135. General Biochemistry		4

Total Units Required	120
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Students pursuing the California State Clinical Laboratory Science license should consult an advisor for additional requirements.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Biological Science, Concentration in Molecular Biology

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of "C or better" (C- not accepted).

University Graduation Requirements 38

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS (EXCEPT FOR 1 COURSE IN GE AREA C AND 1 COURSE IN GE AREA D) AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP (WHICH INCLUDE THE MISSING GE IN AREA C AND D). MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3

Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3

U.S. History and Government	6
HIST 015A. Essentials of U.S. History	M12..... 3
HIST 015B. Essentials of U.S. & California Government	M11..... 3
<i>Can be taken as POLS 015 A/B as well.</i>	

Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government	D2..... 3
MAS 010B. Mexican Americans and the Development of U.S. History and Government.....	M7..... 3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gwar.html .	
<i>A grade of "C or better" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	17
BIOL 055. Introductory Biostatistics	B4 .....3
BIOL 100W. Scientific Communication Workshop	Z .....3
PHYS 002A. Fundamentals of Physics	B1+B3 .....4
PHYS 002B. Fundamentals of Physics.....	B1+B3 .....4
MATH 030. Calculus I.....	B4 .....3
<i>NOTE: MATH 030P (5 units), or MATH 060 (5 units), or Calculus A/B or B/C Advanced Placement Exam with a score of 3 or higher is also acceptable</i>	
Requirements of the Major	42
BIOL 030. Principles of Biology I	B2+B3 .....4
BIOL 031. Principles of Biology II.....	B2+B3 .....4
BIOL 115. General Genetics .....	.....4
BIOL 116. Molecular Genetics .....	.....3
BIOL 116L. Genetics Laboratory.....	.....3
BIOL 135A. Eukaryotic Cell and Molecular Biology I.....	.....3
BIOL 135B. Eukaryotic Cell and Molecular Biology II.....	R .....3
BIOL 135L. Molecular Cell Biology Lab.....	.....2
COMPLETE ONE BIOLOGY LABORATORY ELECTIVE FROM:	
BIOL 107L. Immunology Laboratory .....	.....1
BIOL 125. Systems Physiology Laboratory .....	.....2
BIOL 198. Undergraduate Research .....	.....0.5-4
<i>or other courses with prior advisor approval (the unit must be in Biological Sciences)</i>	
COMPLETE 15 UNITS OF BIOLOGY ELECTIVES:	
BIOL 105. Principles of Developmental Biology.....	.....3
BIOL 107. Immunology .....	.....3
BIOL 117. Human Genetics .....	.....3
BIOL 119. Neurogenetics.....	.....3
BIOL 123A. Bioinformatics I.....	.....3
BIOL 123B. Bioinformatics II.....	.....3
BIOL 124. Systems Physiology.....	.....3
BIOL 136. Vertebrate Neurophysiology .....	.....3
BIOL 137. Introduction to Principles of Toxicology .....	.....3
BIOL 180. Individual Studies.....	.....1-3
BIOL 198. Undergraduate Research .....	.....0.5-4
MICR 101. General Microbiology.....	.....4
MICR 166. Bacterial Genetics.....	.....3
MICR 170. General Virology .....	.....3
<i>or other courses with prior advisor approval (at least 9 elective units must be in Biological Sciences)</i>	
Requirements in the Minor	23
CHEM 001A. General Chemistry.....	B1+B3 .....5
CHEM 001B. General Chemistry	B1+B3 .....5
CHEM 112A. Organic Chemistry.....	.....3

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

CHEM 112B. Organic Chemistry.....	3
CHEM 113A. Organic Chemistry Lab.....	2
CHEM 120S. Chemical Safety Seminar.....	1
CHEM 135. General Biochemistry.....	4

Total Units Required

120

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Biological Science, Concentration in Systems Physiology

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of ""C or better"" (C- not accepted).

University Graduation Requirements 38

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS (EXCEPT FOR 1 COURSE IN GE AREA C AND 1 COURSE IN GE AREA D) AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP (WHICH INCLUDE THE MISSING GE IN AREA C AND D). MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3
Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3
U.S. History and Government	6
HIST 015A. Essentials of U.S. History	M12..... 3
HIST 015B. Essentials of U.S. & California Government	M11..... 3
<i>Can be taken as POLS 015 A/B as well.</i>	
Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government..... D2.....	3
MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7.....	3

Physical Education 2

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gwar.html>.

A grade of ""C or better"" (C- not accepted) is required to meet graduation requirement.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Preparation for the Major		17
BIOL 055. Introductory Biostatistics	B4	3
BIOL 100W. Scientific Communication Workshop	Z	3
PHYS 002A. Fundamentals of Physics	B1+B3	4
PHYS 002B. Fundamentals of Physics	B1+B3	4
MATH 030. Calculus I	B4	3
<i>MATH 030P (5 units) or MATH 060 (5 units) also acceptable</i>		
Requirements of the Major		42
BIOL 030. Principles of Biology I	B2+B3	4
BIOL 031. Principles of Biology II	B2+B3	4
BIOL 115. General Genetics		4
BIOL 124. Systems Physiology		3
BIOL 125. Systems Physiology Laboratory		2
BIOL 135A. Eukaryotic Cell and Molecular Biology I		3
BIOL 178. Integrative Physiology	R	3
Major Electives		19
COMPLETE 16 UNITS FROM:		
BIOL 105. Principles of Developmental Biology		3
BIOL 107. Immunology		3
BIOL 107L. Immunology Laboratory		1
BIOL 131. Endocrine Physiology		3
BIOL 135L. Molecular Cell Biology Lab		2
BIOL 136. Vertebrate Neurophysiology		3
BIOL 137. Introduction to Principles of Toxicology		3
BIOL 165. Advanced Human Anatomy		4
BIOL 167. Cardiorespiratory Physiology		3
BIOL 168. Reproductive Physiology		3
BIOL 180. Individual Studies		1-3
COMPLETE THREE UNITS FROM:		
<i>Courses can also be taken from 16-unit choice list above.</i>		
BIOL 116. Molecular Genetics		3
BIOL 116L. Genetics Laboratory		3
BIOL 117. Human Genetics		3
BIOL 119. Neurogenetics		3
BIOL 135B. Eukaryotic Cell and Molecular Biology II	R	3
MICR 101. General Microbiology		4
MICR 140. Hematology		3
MICR 140L. Hematology Laboratory		2
<i>other courses with prior advisor consent</i>		
Requirements in the Minor		23
CHEM 001A. General Chemistry	B1+B3	5
CHEM 001B. General Chemistry	B1+B3	5
CHEM 112A. Organic Chemistry		3
CHEM 112B. Organic Chemistry		3
CHEM 113A. Organic Chemistry Lab		2
CHEM 120S. Chemical Safety Seminar		1
CHEM 135. General Biochemistry		4
Total Units Required		120

Academic Year 2016-2017 ADDENDUM

Departments & Degrees

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

The following changes were made to the BS Biomedical Engineering and Minor in Biomedical Engineering degree programs The degree requirements for the Bachelor of Science and minor are updated in the degree templates below.

Addition of course to minor and change in units for BS with the following requirement:

BME 177. Physiology for Engineers.....4

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Biomedical Engineering

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Major-Specific Graduation Requirements

The following course in Preparation for the Major must be completed with a "C or better": ENGL 001B.

The following courses in Required in the Major Lower Division Core (LD Core) must be satisfied "C- or Better": MATH 030, MATH 031, MATH 032, PHYS 050, PHYS 051, CHEM 001A, CHEM 001B, Biol 030 and ENGR 010.

The Junior Core which consists of BME 115, BME 117*, BME 130*, BME 174*, BME 177*, and ENGR 100W*, must be completed with a 2.0 or Better, and no individual course grade lower than "C-". Those identified with an asterisk (*) must be completed before enrolling in Senior Project (BME 198A).

Prerequisite Requirements

Any course that is prerequisite to any Chemistry Course must be passed with a grade of "C or better" (C- not accepted).

University Graduation Requirements 18

Core Lower Division General Education 6

Of the 39 units required by the university, 33 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

Upper Division General Education

Of the 9 units required by the university, 9 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 12

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

AMS 001A. American Civilization.....	M4.....	6
AMS 001B. American Civilization.....	M5.....	6

Physical Education

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gwar.html>.

A grade of "C or better" (C- not accepted) is required to meet graduation requirement.

Preparation for the Major 42

BIOL 030. Principles of Biology I.....	B2+B3.....	4
CHEM 001A. General Chemistry.....	B1+B3.....	5
CHEM 001B. General Chemistry.....	B1+B3.....	5
CHEM 008. Organic Chemistry.....		3
CHEM 009. Organic Chemistry Lab.....		1
ENGL 001B. Argument and Analysis.....	C2.....	3
<i>or equivalent second semester composition course.</i>		
MATH 030. Calculus I.....	B4.....	3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

MATH 031. Calculus II	B4	4
MATH 032. Calculus III	B4	3
PHYS 050. General Physics/Mechanics	B1+B3	4
PHYS 051. General Physics/Electricity and Magnetism	B1+B3	4
COMPLETE ONE COURSE FROM:		
MATH 123. Differential Equations and Linear Algebra		3
MATH 133A. Ordinary Differential Equations		3

Requirements of the Major 60

Core Courses 17

CE 095. Theory and Application of Statics		3
EE 098. Introduction to Circuit Analysis		3
ENGR 010. Introduction to Engineering	E	3
ENGR 100W. Engineering Reports	Z+R	3
MATE 025. Introduction to Materials		3
ME 020. Design and Graphics		2

Biomedical Engineering Specific Courses 34

BME 115. Foundations of Biomedical Engineering		4
BME 117. Biotransport Phenomena		3
BME 130. Numerical Methods in Biomedical Engineering		3
BME 147. Quantitative and Statistical Methods for Biomedical Engineers		3
BME 167. Introduction to Engineering Biomechanics		3
BME 174. Biomedical Regulatory Requirements		3
BME 175. Biomaterials		3
BME 177. Physiology for Engineers		3
BME 178. Biomedical Product Realization		3
BME 198A. Senior Design Project I	S	2
BME 198B. Senior Design Project II	V	2
ENGR 195A. Global and Social Issues in Engineering	S	1
ENGR 195B. Global and Social Issues in Engineering	V	1

Must take BME 198A/B and ENGR 195 A/B to meet GE Area S and V requirements

Technical Major Electives 9

Electives must be selected from the approved departmental list in consultation with the students' advisor.

Total Units Required 120

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Minor - Biomedical Engineering

Students must complete a minimum of 13 units as listed under the course requirements. All of these units must be outside the requirements for the student’s major, i.e., the same courses cannot be listed both on the minor and the major forms. BME 115 (4 units) and BME 177 (3 units) are required for all students taking this minor. In consultation with the Biomedical Engineering advisor, students must select one additional course from a group of biomedical engineering-based courses. It is the student’s responsibility to make sure that the prerequisites for each course are met. Students in majors other than engineering, biology, chemistry or physics will probably need to take additional courses to meet prerequisites for the courses required for this minor. This sequence of courses is the recommended pattern for engineering majors. Alternative patterns may be approved by the Biomedical Engineering advisor for students majoring in biology, physics or chemistry.

Requirements of the Minor	13
BME 115. Foundations of Biomedical Engineering.....	4
BME 177. Physiology for Engineers.....	4
COMPLETE TWO COURSES FROM:	
BME 117. Biotransport Phenomena.....	3
BME 147. Quantitative and Statistical Methods for Biomedical Engineers.....	3
BME 167. Introduction to Engineering Biomechanics.....	3
BME 174. Biomedical Regulatory Requirements	3
BME 175. Biomaterials.....	3
BME 177. Physiology for Engineers.....	3
BME 178. Biomedical Product Realization.....	3
EE 127. Electronics for Biomedical Applications.....	3
Total Units Required	13

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Business

Lucas College and Graduate School of Business

The following changes were made to the undergraduate Business Administration degree programs. The degree requirements for the Bachelor of Science are updated in the degree templates below.

Concentration grade minimum changed for the following requirement:

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for Business Analytics must be completed with a grade of "C or better".

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for General Business must be completed with a grade of "C or better".

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for Management Information Systems must be completed with a grade of "C -or better"

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Business Administration, Concentration in Business Analytics

Business Analytics is a quantitative approach to business, driven by the intelligent use of data and mathematical models. Practitioners leverage methods from statistics and operations research to form insights and make decisions that improve business performance. Business analytics is crucial to a broad range of industries. Banks need to perform credit risk analysis and analyze streaming transactions in real time to quickly identify potential fraud. Utility companies need to analyze energy usage data to gain a better understanding of demand patterns. Retailers need to perform markdown optimizations, firm-wide liquidity management, and understand the social sentiment around their products and markets to develop more effective campaigns and promotions. Business Analytics helps such organizations uncover insights from big data, build models that relate actions to consequences, and perform optimization and simulation analyses that lead to quality decisions and better outcomes in shorter times. The job opportunities for graduates with data analytical skills have never been more numerous. The business analytics concentration is designed to cater to this need by equipping our undergraduates with the skills needed to crunch huge data sets into meaningful information to further facilitate smart business decision-making

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for Business Analytics must be completed with a grade of "C- or better". The following Preparation for the Major and Required for the Major courses must be completed with a grade of "C or better": ENGL 2, MATH 71, BUS1 20, BUS2 90.

University Graduation Requirements	35
Core Lower Division General Education	24
Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.	
NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP. MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.	
Upper Division General Education	3
Of the 9 units required by the university, 6 units may be satisfied by coursework outlined below. Consult with major advisor for details.	
American Institutions	6
Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.	
COMPLETE ONE SEQUENCE FROM:	
African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3
Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3
U.S. History and Government	6
HIST 015A. Essentials of U.S. History M12	3
HIST 015B. Essentials of U.S. & California Government M11	3
<i>Can be taken as POLS 015 A/B as well.</i>	
Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government..... D2.....	3
MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7.....	3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gwar.html .	
<i>A grade of ""C or better"" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	17
ECON 001A. Principles of Economics: Macroeconomics	4
ECON 001B. Principles of Economics: Microeconomics D1	4
ENGL 002. Critical Thinking and Writing..... A3	3
<i>or equivalent.</i>	
MATH 071. Calculus for Business and Aviation..... B4	3
<i>Transfer students with MATH 30 ("C or better") may use this in lieu of MATH 71.</i>	
COMPLETE ONE COURSE FROM:	
COMM 100W. Writing Workshop: Writing for Influence Z	3
ENGL 100WB. Written Communication: Business..... Z	3
LLD 100WB. Writing Workshop for Business Students..... Z	3
Requirements of the Major	61
Core Courses	43
Lower Division Courses	13
BUS3 010. Discovering Business..... 0	0
<i>BUS3 010 is not required, but recommended.</i>	
BUS1 020. Financial Accounting..... 3	3
BUS1 021. Managerial Accounting..... 3	3
BUS3 080. Legal Environment of Business..... 3	3
BUS2 090. Business Statistics 3	3
<i>Transfer students with STAT 095 ("C or better") may use this in lieu of BUS2 090.</i>	
BUS4 091L. Computer Tools for Business..... 1	1
Business Fundamentals	15
BUS2 130. Introduction to Marketing..... 3	3
BUS5 140. Fundamentals of Operations Management..... 3	3
BUS3 160. Fundamentals of Management and Organizational Behavior..... 3	3
BUS1 170. Fundamentals of Finance..... 3	3
BUS2 190. Quantitative Business Analysis..... 3	3
Business Integration and Perspective Courses	15
BUS5 187. Global Dimensions of Business 3	3
BUS4 188. Business Systems and Policy 3	3
BUS3 189. Strategic Management 3	3
PHIL 186. Professional and Business Ethics S 3	3
One non-business global perspectives course in Area V..... 3	3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Concentration Requirements	18
<p>Additionally, to qualify for a baccalaureate degree in Business Administration with concentration in Business Analytics, all courses in the concentration must be completed with a grade of "C" or better. A cumulative 2.0 GPA is required in all business classes.</p>	
BUS2 194A. Statistical Analysis	3
BUS2 194B. Business Analytics	3
COMPLETE FOUR COURSES FROM:	
BUS2 132B. Business Logistics	3
BUS2 137A. Soft Skills.....	3
BUS2 138. Marketing Research.....	3
BUS2 191. Decision Making Under Uncertainty.....	3
BUS2 193. Data Mining.....	3
BUS2 195A. Spreadsheet Modeling.....	3
BUS2 195B. Data Visualization	3
BUS2 195C. Simulation Modeling and Analysis	3
BUS2 195D. Analytic Strategy	3
BUS4 116. Advanced Database Management Systems.....	3
BUS4 118S. Special Topics in MIS	3
University Electives	7
<hr/>	
Total Units Required	120

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

BS - Business Administration, Concentration in General Business

The general business concentration offers students a broad spectrum of courses to prepare them for careers in small, medium-sized or family businesses and for jobs with companies that train new employees in a specific job largely unrelated to a functional area such as managing a large retail store or servicing technology company's customers.

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for General Business must be completed with a grade of "C- or better". The following Preparation for the Major and Required for the Major courses must be completed with a grade of "C or better": ENGL 2, MATH 71, BUS1 20, BUS2 90.

University Graduation Requirements 35

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP. MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 3

Of the 9 units required by the university, 6 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3
Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3
U.S. History and Government	6
HIST 015A. Essentials of U.S. History	M12..... 3
HIST 015B. Essentials of U.S. & California Government	M11..... 3
<i>Can be taken as POLS 015 A/B as well.</i>	
Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government..... D2.....	3
MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7.....	3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gvar.html .	
<i>A grade of "C or better" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	17
ECON 001A. Principles of Economics: Macroeconomics	4
ECON 001B. Principles of Economics: Microeconomics	D1 4
ENGL 002. Critical Thinking and Writing	A3 3
<i>or equivalent.</i>	
MATH 071. Calculus for Business and Aviation	B4 3
<i>Transfer students with MATH 30 ("C or better") may use this in lieu of MATH 71.</i>	
COMPLETE ONE COURSE FROM:	
ENGL 100WB. Written Communication: Business	Z 3
COMM 100W. Writing Workshop: Writing for Influence	Z 3
LLD 100WB. Writing Workshop for Business Students	Z 3
Requirements of the Major	61
Core Courses	43
Lower Division Courses	13
BUS3 010. Discovering Business	0
<i>BUS3 010 is not required, but recommended</i>	
BUS1 020. Financial Accounting	3
BUS1 021. Managerial Accounting	3
BUS3 080. Legal Environment of Business	3
BUS2 090. Business Statistics	3
<i>Transfer students with STAT 095 ("C or better") may use this in lieu of BUS2 090.</i>	
BUS4 091L. Computer Tools for Business	1
Upper Division Business Fundamentals Courses	15
BUS2 130. Introduction to Marketing	3
BUS5 140. Fundamentals of Operations Management	3
BUS3 160. Fundamentals of Management and Organizational Behavior	3
BUS1 170. Fundamentals of Finance	3
BUS2 190. Quantitative Business Analysis	3
Upper Division Business Integration and Perspectives Courses	15
BUS5 187. Global Dimensions of Business	3
BUS4 188. Business Systems and Policy	3
BUS3 189. Strategic Management	3
PHIL 186. Professional and Business Ethics	S 3
One non-business global perspectives course in Area V	3
Concentration Requirements	18
Required Courses	12
Courses selected must include at least one each from Marketing and Organization and Management. There could be as many as 12 units from any one department and as many as 6 units of advisor approved transfer credit. All these courses require grades of "C- or better".	

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Additional Courses	6
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Any upper division business courses. Please see an advisor for a current list of acceptable courses. All these courses require grades of "C- or better".

University Electives	7
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Total Units Required	120
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Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Business Administration, Concentration in Management Information Systems

The Concentration in Management Information System merges the knowledge of information technologies, systems and management. Students gain practical knowledge and skills in integrating computers and other data/text/image/graphics/voice technologies into the management of business information. Computerized systems are developed as applied information tools for managerial decision making and action taking. Graduates of the MIS concentration will be prepared for careers in the rapidly expanding profession of using information technologies to support management planning and control.

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major-Specific Graduation Requirements

All courses in the Concentration Requirements for Management Information Systems must be completed with a grade of "C or better". The following Preparation for the Major and Required for the Major courses must be completed with a grade of "C or better": ENGL 2, MATH 71, BUS1 20, BUS2 90.

University Graduation Requirements 35

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

Upper Division General Education 3

Of the 9 units required by the university, 6 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies 6

- AFAM 002A. African-Americans and the Development of America's History and Government..... D2..... 3
- AFAM 002B. African-Americans and the Development of America's History and Government..... M7..... 3

Asian American Studies 6

- AAS 033A. Asian Americans in U.S. History I..... D2..... 3
- AAS 033B. Asian Americans in U.S. History II..... M7..... 3

U.S. History and Government 6

- HIST 015A. Essentials of U.S. History M12 3
- HIST 015B. Essentials of U.S. & California Government M11 3
- Can be taken as POLS 015 A/B as well.*

Mexican American Studies 6

- MAS 010A. Mexican Americans and the Development of U.S. History and Government..... D2..... 3
- MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7..... 3

Physical Education 2

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gwar.html>.

A grade of "C or better" (C- not accepted) is required to meet graduation requirement.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Preparation for the Major	17
ECON 001A. Principles of Economics: Macroeconomics	4
ECON 001B. Principles of Economics: Microeconomics..... D1.....	4
ENGL 002. Critical Thinking and Writing..... A3.....	3
<i>or equivalent.</i>	
MATH 071. Calculus for Business and Aviation..... B4.....	3
<i>Transfer students with MATH 30 ("C or better") may use this in lieu of MATH 71.</i>	
COMPLETE ONE COURSE FROM:	
COMM 100W. Writing Workshop: Writing for Influence..... Z.....	3
ENGL 100WB. Written Communication: Business..... Z.....	3
LLD 100WB. Writing Workshop for Business Students..... Z.....	3
Requirements of the Major	67
Core Courses	40
Lower Division Courses	13
BUS3 010. Discovering Business.....	0
<i>BUS3 010 is not required, but recommended</i>	
BUS1 020. Financial Accounting.....	3
BUS1 021. Managerial Accounting.....	3
BUS3 080. Legal Environment of Business.....	3
BUS2 090. Business Statistics	3
<i>Transfer students with STAT 095 ("C or better") may use this in lieu of BUS2 090.</i>	
BUS4 091L. Computer Tools for Business.....	1
Upper Division Business Fundamentals Courses	15
BUS2 130. Introduction to Marketing.....	3
BUS5 140. Fundamentals of Operations Management.....	3
BUS3 160. Fundamentals of Management and Organizational Behavior.....	3
BUS1 170. Fundamentals of Finance.....	3
BUS2 190. Quantitative Business Analysis.....	3
Upper Division Business Integration and Perspectives Courses	12
BUS5 187. Global Dimensions of Business	3
BUS3 189. Strategic Management.....	3
PHIL 186. Professional and Business Ethics..... S.....	3
One non-business global perspectives course in Area V.....	3
Concentration Requirements	27
Additional requirements for graduation: to qualify for a baccalaureate degree in business administration with a management information systems concentration, all courses in the concentration together with BUS 110A must be completed with a grade of "C" (2.0) or better.	
Required Courses	21
BUS4 092. Introduction to Business Programming.....	3
BUS4 110A. Fundamentals of Management Information Systems.....	3
BUS4 110B. Systems Analysis and Design.....	3
BUS4 111. Networking and Data Communications.....	3
BUS4 112. Database Management Systems.....	3
BUS4 119B. Business Strategy and Information Systems.....	3
COMPLETE ONE COURSE FROM:	
BUS4 119A. Practicum in MIS.....	3
BUS4 119H. Honors Practicum in MIS.....	3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Additional Courses	6
COMPLETE TWO COURSES FROM:	
BUS4 113. Advanced Business Programming.....	3
BUS4 113J. Advanced Business Programming in Java.....	3
BUS4 114. Advanced Systems Analysis and Design.....	3
BUS4 115. Advanced Networking and Data Communications.....	3
BUS4 116. Advanced Database Management Systems.....	3
BUS4 118B. Executive Support and Expert Systems.....	3
BUS4 118C. Information Security and Assurance Management.....	3
BUS4 118W. Web Based Computing.....	3
University Electives	1
Total Units Required	120

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

The following changes were made to the MS in Math degree program. The degree requirements for the Master of Science in Math was updated in the degree templates below.

Course number and sequence update for the following requirement:s

Required Core Courses 12

COMPLETE TWO SEQUENCES FROM:

Sequence One	
MATH 243A. Advanced Numerical Analysis.....	3
MATH 243B. Advanced Topics in Numerical Analysis.....	3
Sequence Two	
MATH 233A. Applied Mathematics I.....	3
MATH 233B. Applied Mathematics II.....	3
MATH 243M. Numerical Linear Algebra.....	3
Sequence Three	
MATH 234. Advanced Dynamical Systems.....	3
MATH 279A. Graph Theory.....	3
MATH 279B. Advanced Graph Theory.....	3

Culminating Experience 3

Plan A - Thesis Option	
MATH 299. Master's Thesis.....	3
Plan B - Writing Project Option	
MATH 298. Special Study.....	3
Plan B - Comprehensive Exam Option	
MATH 298E. Mathematics Comprehensive Exam Preparation.....	3

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

MS - Mathematics

This degree is appropriate for students who seek to deepen their knowledge of mathematics and its applications for work in the research and development area of industry.

Requirements for Admission to Classified Standing

To enter this program with classified standing, a student must meet the minimum requirements for admission to the Graduate Division; have completed 18 semester units of upper-division mathematics with a grade point average of at least 3.0; and have 1-3 letters of recommendation submitted on his or her behalf. The coursework must be acceptable toward a bachelor's degree in mathematics and may not be counted toward the MS degree.

Requirements for Admission to Conditionally Classified Standing

A student who meets the minimum requirements for admission to the Graduate Division but does not satisfy the mathematics coursework requirements stated above may be admitted as a Conditionally Classified student. Eligibility is determined on a case-by-case basis. After arrival at SJSU, such a student must complete additional coursework to make up the unit deficiency in order to achieve Classified status. These makeup units will not be included in the MS degree unit requirement total.

Requirements for Admission to Candidacy for the MS - Mathematics

To be admitted to candidacy for the MS degree, a student must meet the all-university candidacy admission requirements as stated in this catalog. The University requires that all graduate students complete the Graduation Writing Assessment Requirement (GWAR) as a condition for advancement to candidacy. Please refer to the SJSU catalog section titled "Graduation Writing Assessment Requirement" for details. For graduate courses that meet the GWAR, please refer to the Graduate Admissions and Program Evaluations (GAPE) website at www.sjsu.edu/gape.

Per University regulations, Thesis/Writing Project students must have their thesis/project committees (see below) in place before filing for candidacy.

The student must complete the Petition for Advancement to Graduate Candidacy form. This form lists, among other things, all the coursework to be counted toward the master's degree. After the form has been signed by the student's thesis or writing project director (if applicable) and the Graduate Coordinator, it is forwarded to the Associate Vice President for Graduate Studies and Research for final approval. Any subsequent changes to the student's program require approval from GAPE.

Completing Requirements for the MS - Mathematics

Culminating Experience

Students choose either the Comprehensive Examination option or the Thesis/Writing Project option.

1. Comprehensive Examination Option:

Students who elect this option must pass two written comprehensive examinations. One examination will be in either Numerical Analysis (243A and 243B/M) or Differential Equations/Dynamical Systems (233A/B and 234) or Graph Theory (279A/B). The second exam will be in one of Numerical Analysis, Differential Equations/Dynamical Systems, Graph Theory, or Complex Analysis (238).

a) Specific exam options to be chosen by the student.

b) Students must enroll in MATH 298E in conjunction with taking the exams. Student receives credit when both exams are passed. Students who do not pass both exams during the semester they are enrolled in MATH 298E will receive a grade of "RP" for that course. If all other degree requirements have been completed, students must subsequently sign up for MATH 1290R in compliance with University regulations until both exams have been passed.

2. Thesis or Writing Project Option:

A student who elects this option must find a willing thesis/writing project advisor and complete a thesis or writing project under that advisor's supervision. The thesis or writing project must be reviewed and approved by a Thesis/Writing Project Committee composed of the advisor and two other faculty members chosen by the student in consultation with the advisor. The student must give a public presentation on the thesis or writing project, which is followed by an oral examination (thesis/writing project defense) conducted by the committee. Theses must be filed with the Associate Vice President for Graduate Studies and Research, subject to the rules and deadlines established by GS&R.

a) Thesis students must enroll in MATH 299: Master's Thesis; Writing Project students must enroll in MATH 298: Special Study. The student receives credit when the thesis/writing project is completed, successfully defended and all committee members have signed off on the thesis/project. Students who do not complete their theses during the semester they are enrolled in MATH 299 (MATH 298 for writing projects) will receive a grade of "RP" for that course. If all other degree requirements have been completed, students must subsequently sign up for MATH 1290R in compliance with University regulations until the thesis/writing project is completed and defended.

Graduation Writing Assessment Requirement

At SJSU, students must pass the Graduation Writing Assessment Requirement (GWAR). For information on the GWAR, please see <http://info.sjsu.edu/gcw.html>.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Requirements of the Masters

Required Core Courses

12

COMPLETE TWO SEQUENCES FROM:

Sequence One

MATH 243A. Advanced Numerical Analysis.....3

COMPLETE ONE COURSE FROM:

MATH 243B. Advanced Topics in Numerical Analysis.....3

MATH 243M. Numerical Linear Algebra.....3

Sequence Two

MATH 233A. Applied Mathematics I.....3

COMPLETE ONE COURSE FROM:

MATH 233B. Applied Mathematics II.....3

MATH 243. Advanced Dynamical Systems.....3

Sequence Three

MATH 279A. Graph Theory.....3

MATH 279B. Advanced Graph Theory.....3

Other Required Courses

6

COMPLETE ONE COURSE FROM:

MATH 203. Applied Mathematics, Computation, and Statistics Projects.....3

MATH 298j. Applied Mathematics Internship.....3

COMPLETE ONE COURSE FROM:

MATH 261A. Regression Theory and Methods.....3

MATH 263. Stochastic Processes.....3

or other pre-approved graduate statistics course

Major Electives

6

COMPLETE TWO COURSES FROM:

MATH 213A. Introduction to Smooth Manifolds.....3

MATH 213B. Introduction to Riemannian Geometry.....3

MATH 229. Advanced Matrix Theory.....3

MATH 233A. Applied Mathematics I.....3

MATH 233B. Applied Mathematics II.....3

MATH 234. Advanced Dynamical Systems.....3

MATH 235. Wavelets and their Applications.....3

MATH 238. Advanced Complex Variables.....3

MATH 243A. Advanced Numerical Analysis.....3

MATH 243B. Advanced Topics in Numerical Analysis.....3

MATH 243M. Numerical Linear Algebra.....3

MATH 261A. Regression Theory and Methods.....3

MATH 263. Stochastic Processes.....3

MATH 279A. Graph Theory.....3

MATH 279B. Advanced Graph Theory.....3

MATH 285. Advanced Topics in Mathematics.....3

MATH 298. Special Study.....3

Pre-approved 100- or 200-Level Mathematics Electives

6

Excluding MATH 100W, MATH 101, MATH 102, MATH 105, MATH 106, MATH 107A, MATH 107B, MATH 110L, MATH 123, MATH 129A, MATH 133A, MATH 160, MATH 201A, MATH 201B, MATH 297. The elective units may include a maximum of 3 units of MATH 180 and/or MATH 298.

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Culminating Experience	3
Plan A - Thesis Option	
MATH 299. Master's Thesis	3
Plan B - Writing Project Option	
MATH 298. Special Study	3
Plan C - Comprehensive Exam Option	
MATH 298E. Mathematics Comprehensive Exam Preparation	3
Total Units Required	33

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Mechanical Engineering Department

College of Engineering

The following changes were made to the BS in Mechanical Engineering degree program. The degree requirements for the BS in Mechanical Engineering was updated in the degree templates below.

Update to overall grade minimum for the following requirement:

Major-Specific Graduation Requirements

The following course in Preparation for the Major must be completed with a "C or better": ENGL 001B

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

BS - Mechanical Engineering

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

Major Exceptions

This degree program meets certain University Requirements through approved major modifications. Please see the [Major Exceptions](#) area in the Policy and Procedures section of this catalog to identify the specific adjustments for this degree program or contact your major advisor for more details.

Major-Specific Graduation Requirements

All courses in Required in the Major (all courses in core, required, technical electives) must be completed with a grade of "C- or better". The following course in Preparation for the Major must be completed with a "C or better": ENGL 001B

University Graduation Requirements 18

Core Lower Division General Education 6

Of the 39 units required by the university, 33 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

Upper Division General Education

Of the 9 units required by the university, 9 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 12

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

AMS 001A. American Civilization.....	M4.....	6
AMS 001B. American Civilization.....	M5.....	6

Physical Education

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gvar.html>.

A grade of "C or better" (C- not accepted) is required to meet graduation requirement.

Preparation for the Major 33

CHEM 001A. General Chemistry.....	B1+B3	5
ENGL 001B. Argument and Analysis	C2	3
<i>or equivalent second semester composition course.</i>		
MATH 030. Calculus I.....	B4	3
MATH 031. Calculus II	B4	4
MATH 032. Calculus III	B4	3
MATH 133A. Ordinary Differential Equations		3
PHYS 050. General Physics/Mechanics	B1+B3	4
PHYS 051. General Physics/Electricity and Magnetism.....	B1+B3	4
PHYS 052. General Physics/Waves, Light, Heat.....	B1+B3	4

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Requirements of the Major		69
Core Courses		17
CE 095. Theory and Application of Statics	3	
EE 098. Introduction to Circuit Analysis.....	3	
ENGR 010. Introduction to Engineering..... E	3	
MATE 025. Introduction to Materials	3	
ME 020. Design and Graphics.....	2	
ME 030. Computer Applications.....	2	
ME 041. Machine Shop Safety.....	1	
Required Courses		43
CE 112. Mechanics of Materials	3	
ENGR 100W. Engineering Reports..... Z+R.....	3	
ME 101. Dynamics.....	3	
ME 106. Fundamentals of Mechatronics Engineering	3	
ME 111. Fluid Mechanics.....	3	
ME 113. Thermodynamics.....	4	
ME 114. Heat Transfer	3	
ME 115. Thermal Engineering Laboratory.....	1	
ME 120. Experimental Methods.....	2	
ME 130. Applied Engineering Analysis.....	3	
ME 147. Dynamic Systems Vibration and Control	3	
ME 154. Mechanical Engineering Design.....	4	
ME 195A. Senior Design Project I	3	S
ME 195B. Senior Design Project II.....	3	V
ENGR 195A. Global and Social Issues in Engineering.....	1	S
ENGR 195B. Global and Social Issues in Engineering	1	V
<i>Must take both ME and ENGR 195 A and B to meet Area requirements</i>		
Required Capstone Courses		3
COMPLETE ONE COURSE FROM:		
ME 157. Mechanical System Design.....	3	
ME 182. Thermal Systems Design	3	
ME 190. Mechatronics System Design.....	3	
Technical Electives		6
Technical electives can be chosen from designated courses for breadth or focus in one of the three areas of mechanical design, mechatronics, or thermal/fluids, with advisor approval.		
Total Units Required		120

Academic Year 2016-2017 ADDENDUM

Departments & Degrees

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

The following changes were made to the undergraduate Meteorology and Climate Science degree programs. The degree requirements for the BS degree have updated in the degree template below.

University Core Lower Division GE and University Electives updated for the following requirements:

University Graduation Requirements

35

Core Lower Division General Education

21

Of the 39 units required by the university, 18 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

University Electives

2

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BS - Meteorology, Concentration in Climate Science

The BS Meteorology, concentration in Climate Science program is designed to prepare students for careers in emerging fields of climate change studies and mitigation, and related fields including energy and carbon management. Graduating students will be ready to begin careers in the private sector or in government, or will be ready to enter graduate programs in the atmospheric/climate sciences.

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

University Graduation Requirements 38

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

Upper Division General Education 6

Of the 9 units required by the university, 3 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies	6
AFAM 002A. African-Americans and the Development of America's History and Government..... D2.....	3
AFAM 002B. African-Americans and the Development of America's History and Government..... M7.....	3

Asian American Studies	6
AAS 033A. Asian Americans in U.S. History I..... D2.....	3
AAS 033B. Asian Americans in U.S. History II..... M7.....	3

U.S. History and Government	6
HIST 015A. Essentials of U.S. History	M12..... 3
HIST 015B. Essentials of U.S. & California Government	M11..... 3
<i>Can be taken as POLS 015 A/B as well.</i>	

Mexican American Studies	6
MAS 010A. Mexican Americans and the Development of U.S. History and Government..... D2.....	3
MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7.....	3

Physical Education 2

Graduation Writing Assessment Requirement

At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see <http://testing.sjsu.edu/wst>. Exceptions to the GVAR may be found at <http://info.sjsu.edu/gwar.html>.

A grade of "C or better" (C- not accepted) is required to meet graduation requirement.

Preparation for the Major 20

BIOL 031. Principles of Biology II.....	B2+B3.....	4
CHEM 001A. General Chemistry.....	B1+B3.....	5
MATH 030. Calculus I.....	B4.....	3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

PHYS 002A. Fundamentals of Physics	B1+B3	4
PHYS 002B. Fundamentals of Physics.....	B1+B3	4

Requirements of the Major 62

Core Courses 53

COMM 146F. Communication and the Environment.....		4
ENVS 001. Introduction to Environmental Issues.....	D3.....	3
ENVS 119. Energy and the Environment.....	R.....	3
ENVS 133. Sustainable Energy Strategies		3
GEOG 003. Planet Earth.....	B1	3
ISE 103. Life Cycle Engineering		3
METR 012. Global Warming: Science and Solutions	B1	3
METR 040. Weather Seminar		1
METR 050. Scientific Computing I.....		2
METR 051. Scientific Computing II		2
METR 060. Meteorology I.....		3
METR 071. Introduction to Climate Science.....		2
METR 100W. Writing Workshop: Meteorological Reports	Z.....	3
METR 123. Advanced Climatology.....		3
METR 135. The Global Carbon Cycle.....		3
METR 136. Empirical Techniques in Meteorology.....		3
METR 163. Meteorological Instrumentation.....		3
METR 173. Global Climate Modeling.....		3
METR 174. Climate Change Solutions.....		3

Electives 9

COMPLETE NINE UNITS FROM:

ENVS 107. Introduction to Environmental Economics and Policy.....		3
ENVS 116. Solar Energy Analysis.....		3
ENVS 124. Introduction to Environmental Law		3
ENVS 128. Water Resource Management.....		3
ENVS 130. Energy Policy Analysis.....		3
ENVS 132. Solar Home Design		3
GEOG 120. Food Supply and Agricultural Systems.....		3
GEOG 124. Topics in Physical Geography.....		3
GEOG 130. Natural Resources.....		3
GEOG 170. Introduction to Mapping and Geographic Information Systems.....		3
GEOG 171. Advanced Geographic Information Systems.....		3
GEOG 181. Remote Sensing: Basic Theory and Image Interpretation		3
GEOG 182. Remote Sensing: Digital Analysis		3
METR 131. Air Pollution Meteorology		3

Total Units Required 120

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

The following changes were made to the Psychology degree program. The degree requirements for the Bachelor of Arts is updated in the degree template below.

Adjustment of University Electives to the following:

University Electives

22-23

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

BA - Psychology

The undergraduate degree assures a broad coverage of the major areas of content and methods in psychology identified by the American Psychological Association as the backbone of a strong degree program. The goal of the breadth part of the degree requirements is to provide a strong background in general psychology. In addition, sufficient flexibility is offered through choices in fulfilling these requirements and through the electives so that students, in consultation with their advisors, can design a program of study which focuses on each student's particular area of interest.

A carefully prepared multi-year program of study will ensure an appropriate sequencing of required courses (e.g., STAT 95 is a prerequisite for PSYC 100W, PSYC 100W is a prerequisite for PSYC 120, PSYC 120 is a pre- or co-prerequisite for 190/195). Use the advisor's expertise for GE, SJSU Studies, and American Institutions course selection and to ensure a strong foundation for future course work. Seeking advising is especially important to those at risk for probation, those in the honors program, and those planning to go on to graduate school in psychology. The two and four year planners give additional guidance in designing a particular program of study including suggestions about the order in which to take classes even if they are not governed by official prerequisite requirements. All of these materials as well as the extra coursework and other requirements for Departmental Honors are available on the department website www.sjsu.edu/psych or the department office.

Once declared as a psychology major, there are no minimum grade requirements for the major other than an overall 2.0 average across the courses in the major (i.e., a D- can "count" towards meeting psychology requirements).

University Graduation Requirements

Students must complete all residency, curriculum, unit, and GPA requirements as outlined in the [Graduation Requirements section](#) of the Policies and Procedures.

4-Year Program Roadmap

Students may find a roadmap for this program [here](#). These roadmaps are an advising tool that outlines a path of courses a student can take to complete requirements for graduation. Roadmaps should be used in consultation with the catalog and your advisor to identify additional requirements for completing the major (for example course grade minimums).

University Graduation Requirements 41

Core Lower Division General Education 24

Of the 39 units required by the university, 15 units may be satisfied by coursework outlined below. Courses that meet GE Areas A1, A2, A3 or B4 must be passed with a "C- or better" to meet the requirement. Consult with major advisor for details.

NOTE: STUDENTS WHO HAVE COMPLETED THE ADT TRANSFER DEGREE (UNDER SB 1440) FOR THIS MAJOR WILL HAVE COMPLETED ALL LOWER DIVISION GE REQUIREMENTS AND SHOULD FOLLOW THE 60 UNIT GUARANTEE ROADMAP. MEET WITH AN ADVISOR PRIOR TO REGISTERING FOR YOUR FIRST SEMESTER FOR THE 60 UNIT ROADMAP OR SPECIFIC QUESTIONS.

Upper Division General Education 9

Of the 9 units required by the university, 0 units may be satisfied by coursework outlined below. Consult with major advisor for details.

American Institutions 6

Coursework shown below for the 6 units required by the university are double counted within GE. Other courses do meet the American Institutions requirement, but may not include additional GE areas. Consult with major advisor for details.

COMPLETE ONE SEQUENCE FROM:

African American Studies 6

- AFAM 002A. African-Americans and the Development of America's History and Government D2..... 3
- AFAM 002B. African-Americans and the Development of America's History and Government..... M7..... 3

Asian American Studies 6

- AAS 033A. Asian Americans in U.S. History I..... D2..... 3
- AAS 033B. Asian Americans in U.S. History II..... M7..... 3

U.S. History and Government 6

- HIST 015A. Essentials of U.S. History M12..... 3
- HIST 015B. Essentials of U.S. & California Government M11..... 3
- Can be taken as POLS 015 A/B as well.*

Mexican American Studies 6

- MAS 010A. Mexican Americans and the Development of U.S. History and Government D2..... 3
- MAS 010B. Mexican Americans and the Development of U.S. History and Government..... M7..... 3

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

Physical Education	2
Graduation Writing Assessment Requirement	
At SJSU, students must pass both the SJSU Writing Skills Test (WST) and a 100W course. For additional information on the WST, please see http://testing.sjsu.edu/wst . Exceptions to the GVAR may be found at http://info.sjsu.edu/gwar.html .	
<i>A grade of "C or better" (C- not accepted) is required to meet graduation requirement.</i>	
Preparation for the Major	3-4
COMPLETE ONE COURSE FROM:	
BIOL 021. Human Biology	B2+B3 .....3
BIOL 065. Human Anatomy	B2+B3 .....4
Requirements of the Major	45
Lower Division Core	
9	
PSYC 001. General Psychology	D1.....3
PSYC 030. Introductory Psychobiology.....	3
STAT 095. Elementary Statistics.....	B4 .....3
<i>UNVS 015C or UNVS 016C may be used in lieu of the statistics course required by this major.</i>	
Upper Division Core	
28	
PSYC 100W. Writing Workshop.....	Z.....3
PSYC 102. Child Psychology.....	3
PSYC 110. Abnormal Psychology.....	3
PSYC 120. Advanced Research Methods and Design	4
COMPLETE ONE COURSE FROM:	
PSYC 135. Cognition.....	3
PSYC 155. Human Learning.....	3
PSYC 158. Perception	3
COMPLETE ONE COURSE FROM:	
PSYC 139. Psychology of Personality.....	3
PSYC 154. Social Psychology	3
COMPLETE ONE COURSE FROM:	
PSYC 117. Psychological Tests and Measures.....	3
STAT 115. Intermediate Statistics.....	3
COMPLETE ONE COURSE FROM:	
PSYC 129. Neuroscience.....	3
PSYC 160. Clinical Psychology	3
PSYC 170. Industrial and Organizational Psychology.....	3
COMPLETE ONE COURSE FROM:	
PSYC 190. Current Issues Capstone	3
PSYC 195. Honors Seminar in Psychology	3
Psychology Electives	8
Three units of upper or lower division psychology courses	3
Five units of upper division psychology courses.....	5
University Electives	30-31
Total Units Required	120

Social Work Program

College of Applied Sciences and Arts

The following changes were made to the Masters in Social Work degree programs The degree requirements for the Masters is updated in the degree templates below.

Added special session MSW program requirements

Academic Year 2016-2017 ADDENDUM

Departments & Degrees

Addendum
October 10, 2016

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

MSW - Master of Social Work

The MSW Program offers graduate professional education in advanced social work practice from a transcultural multi-systems perspective, with a particular focus in a field of practice. The curriculum has been developed to emphasize application of skills in those areas of practice where the need for social workers in the next decade will be the greatest in the state of California. The program prepares graduates for advanced practice and leadership in the following fields of practice: aging, children, youth, and families; and health/mental health. The graduate program has been fully accredited by the national Commission on Accreditation of the Council on Social Work Education since 1973.

Requirements for Admission to Classified Standing

In addition to the general requirements established by the university as set forth in the Admissions section of this catalog, applicants for admission to classified standing for the Master of Social Work degree must have demonstrated a commitment to social work goals either by having completed undergraduate social work education, or hold a BA in a related field and have significant experience and/or personal involvement with minority groups and communities on social issues.

To be admitted to the program a student must:

1. Complete a separate application for admission to the University, submit required transcripts and pay the required application fees (University and MSW program fees).
2. Complete a separate application to the MSW program which includes:
 - a. An autobiographical statement describing the development of the candidate's interest in the field and professional goals.
 - b. Three letters of recommendation from professionals in the field or former professors who can testify to the candidate's ability to meet the challenges of the profession.
3. Foreign students must score at least 550 on the TOEFL and must demonstrate English proficiency in a written essay.
4. The application to the MSW program with the supporting material must be sent directly to the Director of Admissions of the MSW program for review and recommendation by the MSW program admissions committee.

Requirements for Admission to Conditionally Classified Standing

Students who do not meet the minimum GPA requirement of 2.5 may apply for conditionally classified status. The MSW Admission Committee may consider applicants who possess strong or considerable work experience and who can remedy minor academic deficiencies by additional preparation.

Requirements for Admission to Candidacy

To be admitted to candidacy for the Master of Social Work degree, students must meet the general requirements of the university as set forth in the Academic Regulations section of this catalog. The University requires that all graduate students complete the Graduation Writing Assessment Requirement (GWAR) as a condition for advancement to candidacy. Please refer to the SJSU catalog section titled "Graduation Writing Assessment Requirement" for details. For graduate courses that meet the GWAR, please refer to the Graduate Admissions and Program Evaluations website at <http://www.sjsu.edu/gape>.

The applicant must demonstrate aptitude for advanced study in social work, as measured by successful completion of the first year of study, instructor appraisals, evaluation of previous academic work, recommendations by qualified professionals, or other assessments.

The applicant must meet with the MSW graduate advisor to complete an application for candidacy. The application includes an official program of study listing all courses needed to complete the requirements for the degree. The program of study must be approved by the MSW graduate advisor and then by the Associate Dean for Graduate Studies, who notifies the student of acceptance into candidacy.

Completing Requirements for the Master of Social Work Degree

The MSW program offers both a full-time and a 3-year plan of study. Full-time study requires a two-year commitment to the program, while the 3-year plan may be completed in a three year structured plan of study. With either plan, the course requirements for completing the degree are identical.

The student must complete a total of not less than 60 semester units of study in social work with a minimum grade point average of 3.0 overall. This includes two years (1200 hours) of field internship in a social agency or community setting selected and approved by the MSW field education committee.

Candidates for the degree have the option of either completing a thesis (Plan A) or a project (Plan B) and to defend their study before a thesis/project committee as part of their 60 semester unit degree requirement. Students choosing to complete a thesis must meet program prerequisites and receive approval of the research committee. The topic must relate to the candidate's area of practice and to the mission of the MSW program. The thesis must meet all university requirements in content and format. The special project must be a professionally written study based on the student's field placement.

As deemed appropriate by the faculty of the social work program, satisfactory performance in final examinations in the core areas of social work practice may be required. These examinations may be written, oral or both.

Students are required to complete their Graduation Writing Assessment Requirement (GWAR) to be advanced to candidacy for the master's degree by meeting the University GWAR and MSW requirements.

**Academic Year
2016-2017
ADDENDUM
Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

The Curriculum (60 Semester Units Total)

The First Year Curriculum (32 Semester Units)

In the first year students develop a solid foundation in generalist social work practice with the goal of effective performance under the guidance and supervision of a professional social worker. The primary skills and competencies that are taught consist of the ability to assess, plan, implement and evaluate practice with systems of varying size from a transcultural perspective.

The Second Year Curriculum (28 Semester Units)

The second year of the MSW program sequentially builds upon foundation content attained in the first year to prepare students for advanced practice from a transcultural and multi-systems perspective. As students progress through the program they are expected to increase their levels of independence, initiative and leadership, utilizing greater discretion and judgment for self-direction and professionally autonomous practice, with systems of varying size.

In addition, content is included on the fields of practice which are particularly connected to the mission of the program and the practice needs of the region: aging; children, youth, and families; and health/mental health, particularly those who are Latino, African American, Asian American and Native American, and are communities, groups, families and individuals who are disenfranchised, oppressed and/or marginalized.

The 3-year Program

The MSW Program offers a 3-year program designed for working professionals and includes course work in the evenings and on weekends. The 3-year program requires three years of academic work combined with two years of field practicum. Depending on the courses offered during the summer term, this time period for 3-year students may be accelerated.

3-year students complete the first year curriculum requirements in two years. In the second year, 3-year students enter the field practicum and concurrently enrolled in social work practice courses. Field instruction in the 3-year MSW Program meets the same administrative and educational requirements as the full-time program.

Year Round Operations

To assist "matriculated students" in progressing more rapidly toward earning their MSW degree, and to increase accessibility year around to the course curriculum for both full-time and 3-year students, the MSW Program offers a limited number of "regular" graduate level courses during the summer term. The range of classes (number and type) offered by MSW Program will depend on student interest and faculty resources.

Master of Social Work

Graduation Writing Assessment Requirement

At SJSU, students must pass the Graduation Writing Assessment Requirement (GWAR). For information on the GWAR, please see <http://info.sjsu.edu/gcw.html>.

Requirements of the Masters

60

First Year Core Curriculum

31

Fall Semester..... 16

SCWK 202. Social Policy and Services: History and Values.....	3
SCWK 212. Human Behavior in the Social Environment I	3
SCWK 220. Transcultural Generalist Practice I	3
SCWK 230. Social Work Practicum I.....	2-5
SCWK 240. Research Methods and Design.....	3

Spring Semester..... 15

SCWK 204. Social Policy Analysis	3
SCWK 214. Human Behavior in the Social Environment II.....	3
SCWK 221. Transcultural Generalist Practice II.....	3
SCWK 231. Social Work Practicum II	2-5
SCWK 242. Research Methods, Data Analysis and Evaluation	3

Second Year Core Curriculum (Transcultural Multi-Systems)

29

Fall Semester..... 15

Those applying for the Title IV-E stipend program must complete the Children, Youth and Families field of practice.

Academic Year
2016-2017
ADDENDUM
Departments
& Degrees

Addendum
October 10, 2016

ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE

Aging	
SCWK 251. Social Work with Aging Populations.....	3
SCWK 232. Social Work Practicum III.....	2-5
SCWK 298. Special Study.....	1-4
One SCWK Elective.....	3

Children, Youth and Families	
SCWK 222. Transcultural Advanced Generalist Practice I: Family Systems Focus.....	3
SCWK 232. Social Work Practicum III.....	2-5

COMPLETE ONE COURSE FROM:	
SCWK 261. Social Work Practice with Children.....	3
SCWK 262. Social Work Practice with Adolescents.....	3
Two Electives.....	6

Health/Mental Health	
SCWK 232. Social Work Practicum III.....	2-5
SCWK 281. Social Work in Health/Mental Health.....	3
SCWK 298. Special Study.....	1-4
Two Electives.....	6

Spring Semester.....	14
SCWK 233. Social Work Practicum IV.....	2-5
SCWK 298. Special Study.....	1-4
One Elective.....	3

COMPLETE ONE COURSE FROM:	
SCWK 250. Policy Practice in Aging.....	3
SCWK 260. Policy Practice in Child and Family Welfare.....	3
SCWK 280. Policy Practice in Health/Mental Health.....	3

Total Units Required 60

Once the field of practice is selected, students must continue with the required courses in that respective curriculum plan.

Master of Social Work- Hybrid (Special Session Program)

Special Session Program Information

Academic Programs offered through [Special Session](#) are operated by the College of International and Extended Studies (IES). Registration and enrollment in a [Special Session course or program](#) must use the special session application form and will follow special session fee and course schedules. Note that regular session students seeking to enroll simultaneously in a special session course or program will trigger a separate and additional set of fees. This may require an additional enrollment appointment from the Registrar and it may have implications for financial aid status or requirements. Please visit the [IES website](#) for more information.

Course Requirements

Graduation Writing Assessment Requirement

At SJSU, students must pass the Graduation Writing Assessment Requirement (GWAR). For information on the GWAR, please see <http://info.sjsu.edu/gcw.html>.

Requirements of the Masters 60

First Year Core Curriculum 26	
SCWK 202. Social Policy and Services: History and Values.....	3
SCWK 212. Human Behavior in the Social Environment I.....	3
SCWK 214. Human Behavior in the Social Environment II.....	3
SCWK 220. Transcultural Generalist Practice I.....	3

**Academic Year
2016-2017
ADDENDUM**

**Departments
& Degrees**

**Addendum
October 10, 2016**

**ALL DATES, FEES & INFORMATION
SUBJECT TO
CHANGE WITHOUT NOTICE**

SCWK 221. Transcultural Generalist Practice II.....	3
SCWK 230. Social Work Practicum I.....	2-5
SCWK 231. Social Work Practicum II.....	2-5
SCWK 240. Research Methods and Design.....	3

Second Year Core Curriculum 34

SCWK 204. Social Policy Analysis.....	3
SCWK 222. Transcultural Advanced Generalist Practice I: Family Systems Focus.....	3
SCWK 232. Social Work Practicum III.....	2-5
SCWK 233. Social Work Practicum IV.....	2-5
SCWK 242. Research Methods, Data Analysis and Evaluation.....	3
SCWK 262. Social Work Practice with Adolescents.....	3
SCWK 298. Special Study.....	1-4

Specialization Option..... 6

DEPTH ONE: CHILDREN, YOUTH AND FAMILIES

SCWK 260. Policy Practice in Child and Family Welfare.....	3
SCWK 261. Social Work Practice with Children.....	3

DEPTH TWO: HEALTH/MENTAL HEALTH

SCWK 280. Policy Practice in Health/Mental Health.....	3
SCWK 281. Social Work in Health/Mental Health.....	3

Total Units: 60