Curriculum Guide for Prospective Transfer Students

University Core Requirements

Minimum Requirements for Admission

Critical Thinking and Writing I and II	**Tips:** Equates to the two introductory college-level ***composition*** courses for a school. **Must complete both courses prior to attending SCU otherwise may have to complete Critical Thinking & Writing two course sequence once enrolled.** Courses focusing upon topics such as grammar, punctuation, practice with sentence/paragraph formation will not transfer.
Natural Science	**Tips:** Select a course that has a significant laboratory component (either separately or included with class) that is noted; lab component must be minimum of two hours per week to qualify to transfer in as a lab science; content will be assessed on case by case basis. Please note that certain majors (especially those within natural sciences and Engineering) have specific laboratory science requirements. Check the SCU website for your particular area of study to research major requirements.
Mathematics *Students seeking ***Bachelor of Arts*** or ***Social Science*** need one math course from statistics, finite math, or calculus (Economics majors need Calculus; Liberal Studies and Anthropology majors need Statistics). *Students seeking a ***Bachelor of Science in Natural Science, Computer Science, Commerce or Engineering*** will need two terms of Calculus.	**Tips:** Not all math courses are transferable. SCU does not accept courses in algebra, trigonometry, and geometry, as transferable. One pre-calculus course will be eligible to transfer in for elective units. Be aware that courses such as Brief Calculus may not be transferable due to course information that may not be covered. **Math Courses Offered at SCU:** Finite Math, Calculus for the Social Sciences, Introduction to Statistics, Calculus & Analytic Geometry (four quarters), Differential Equations, Calculus for Business (two quarters). **Sample Math Descriptions:** ***SCU Math 6 - Finite Mathematics for Social Sciences Course Description:*** Introduction to finite mathematics with applications to the social sciences. Sets, logic, combinatorial problems, probability, vectors and matrices. (4 units) ***SCU Math 7 - Calculus for Social Sciences Course Description:*** Introduction to differential and integral calculus with applications to the social sciences. Ordinarily, only one of MATH 7, 11, or 30 may be taken for credit. (4 units) ***SCU Math 8 - Introduction to Statistics Course Description:*** Elementary topics in statistics chosen from descriptive statistics, probability, random variables and distributions, sampling, esti-mation, hypothesis testing, regression, and correlation. Prerequisite: MATH 6 or equiv-alent. (4 units) **Link for full list of math course descriptions:** http://www.scu.edu/bulletin/undergraduate/Department-of-Mathematics-and-Computer-Science.cfm

Recommended Courses -- The following courses allow students to complete more of SCU's Core curriculum (general education) requirements:

Cultures and Ideas I and II	**Tips: Highly recommended to complete these requirements prior to attending SCU.** SCU's Cultures & Ideas I and II requirements are satisfied by taking one course that is taught over two quarters focusing upon a specific area of study. You can have these requirements easily taken care of through transfer credit provided you take courses that transfer in as both Cultures and Ideas I and II **PRIOR** to your enrollment at SCU. Otherwise you will have to complete this requirement in its entirety at SCU. Specific criteria for selecting courses that will satisfy Cultures & Ideas I and II are listed below. ***Cultures and Ideas I*** can be met by a class that focuses upon the study of Western Culture or World History (i.e. Western Art History, Western Civilization, Modern European History, World History I or II). ***Cultures and Ideas II*** can be satisfied by taking a course whose focus is within a specific, non-Western area of the world (i.e. Art History of Africa, Buddhism, the History of Women in Japan). The goal of these requirements is to expose students to cultures outside of their frame of reference. Can also be satisfied by a class comparing different cultures globally where the study of the Western world would likely be involved (i.e. Cultural Anthropology, International Relations).

Recommended Courses (continued)

Cultures and Ideas III	**Tips:** ***Cultures and Ideas III*** can be satisfied by taking another course whose focus is within a specific, non-Western area of the world (i.e. Art History of Africa, Buddhism, the History of Women in Japan). The goal of this requirement is to expose students to cultures outside of their frame of reference. Can also be satisfied by a class comparing different cultures globally where the study of the Western world would likely be involved (i.e. Cultural Anthropology, International Relations).
Social Science	**Tips:** Search for an introductory course that studies different areas of culture/society in sociology, psychology, political science, anthropology or economics.
2nd Language	**Tips:** Students must successfully complete the second semester course of the first-year college-level sequence in a classical or modern foreign language or demonstrate an equivalent level of proficiency through examination in order to satisfy SCU's language requirement. **Students may take a language not offered at SCU (i.e. American Sign Language) to fulfill this requirement as long as they successfully complete the requirement *prior* to attending Santa Clara University.** If you attend a school on the quarter system, **Bachelor of Natural Science** students and those in the **Leavey School of Business** only need to complete the second quarter of the first-year language sequence;**Bachelor of Arts and Social Science** students need to complete the entire first year. **ENGINEERING** students are not required to complete course work or pass a proficiency exam, although SCU recommends attaining proficiency level of at least the first college course in a second language.
Arts	**Tips:** Please remember that this requirement is a hands on requirement where the goal is to have the student take part in the arts. It will not be met by taking music/theatre/art appreciation or history course work. Dance, hands on art courses, acting/performance, music, set design are all examples of what can fulfill this requirement. **PLEASE NOTE:** Student will need to take a combined total of 4 quarter units of Fine Arts course work to satisfy requirement and may take multiple courses to reach that total.
Diversity	**Tips:** This requirement requires taking one course which studies examples of diverse human experiences, identities, and cultures in the United States while examining the intersections of***at least two*** different social categories such as race, gender, ethnicity, nationality, age, language, citizenship, religion, class, sexual orientation, physical ability, and so on.
Ethics	**Tips:** If students choose to take an Ethics class there is not a guarantee of transferability. However a student may submit a course syllabus to petition for possible core requirement credit.
Religion, Theology & Culture, Civic Engagement, Advanced Writing, and Science, Technology & Society	**Tips:** These requirements must be met at Santa Clara University.

Individual College Requirements

Leavey School of Business

Introduction to Business
(Two courses)

Tips: The first course is met by an introduction to American Business course.

SCU Business 70 - Contemporary Business Issues Course Description :
An introduction to the nature, forms, and objectives of the contemporary business firm and its relation to the environment in which it operates. (4 units)

SCU OMIS 17 –Introduction to Business Computing Course Description:
Use of an integrated set of software tools to solve business problems and communicate results of analysis. Software tools include spreadsheets, databases, graphical tools, and presentation tools. Use of computer networks to access business information. *Prerequisite:* Working knowledge of one word-processing software. (4 units)

Accounting
(Two courses)

Tips: Must take a minimum of one quarter each of Financial and Managerial accounting coursework.

SCU Accounting 11 --Introduction to Financial Accouting I Course Description:
Overview of the role of financial information in economic decision making. Includes topics such as the dissemination of accounting information and its impact on capital market, and the analysis of corporate annual reports. Coverage of financial statements and their use in determining profitability and the financial condition of a business entity.*Prerequisite:* BUSN 70 and be second year student.

SCU Accounting 12 --Introduction to Managerial Accounting II Course Description:
Introduction to the role of accounting information in the decision making of business managers. The objective is to investigate the use of business data in typical managerial functions such as planning, control, and making operational decisions.*Prerequisite:* ACTG 11.

Data Analysis
(Two courses)

Tips: The first course can usually be met by taking an introduction to statistics course. Transfer credit is rarely given for OMIS 41; however SCU does offer option to challenge a course once enrolled.

SCU OMIS 40- Statistics and Data Analysis I Course Description:
First in a two-course sequence. Students learn to describe, summarize, and evaluate sets of data using numerical and graphical methods; to quantitatively express the probability of events and formulate the probability of joint, marginal, and conditional events; to employ probability distributions to describe the probabilities associated with discrete and continuous random variables; to desig and evaluate sample data collection plans for quantitative and qualitative data; to measure and evaluate the error associated with parameter estimation using samples; and to construct interval estimates for the population mean and the population proportion. Analysis of real-world data using spreadsheet software. Prerequisites: MATH 11 or MATH 30; OMIS 17. (4 units)

SCU OMIS 41- Statistics and Data Analysis II:
Second in a two-course sequence. Students learn to formulate hypotheses about population parameters and define the errors associated with hypothesis testing; to construct confidence intervals and test hypotheses about means, proportions, and variances; to formulate and test hypotheses about multinomial data and independence; to construct and evaluate both simple linear and multiple regression models; and to predict the value of dependent variables using regression models. Analysis of real-world data using spreadsheet software. Prerequisite: OMIS 17 and OMIS 40. (4 units)

Individual College Requirements

Leavey School of Business

Economics
(Three courses)

Tips: Two of the three requirements are usually transferable by taking Introduction to Microeconomics and Introduction to Macroeconomics courses. The third course is not as commonly offered at other institutions so pay close attention to our description.

SCU Economics 1 - Principles of Microeconomics Course Description:
Introduction to microeconomics and its applications to business decisions and public policy. Topics include supply, demand, and the coordinating role of prices in a market economy; the behavior of business firms, including output and pricing decisions; competition and monopoly; government policies and regulations affecting markets. (4 units)

SCU Economics 2 - Principles of Macroeconomics Course Description:
Determinants of national income and product in the long run and short run; inflation, unemployment, and business cycles; monetary and fiscal policies; and economic growth. *Prerequisite:* ECON 1. (4 units)

SCU Economics 3 - International Economics, Development, and Growth Course Description:
Analysis of international trade theory and policy, balance of payments adjustments and exchange rate regimes, and economic development. Prerequisite: ECON 2. (4 units)

Information Systems
(One course)

Tips: This course does not transfer in regularly, so be please be aware of this if trying to take elsewhere.

SCU OMIS 34--Science, Information Technology Business, and Society Course Description:
Examines the complex relationship between science, information technology, business, and society. Investigates major breakthroughs in information technoolgy, how they were influenced by business needs and how they affect business and society. Explores social and cultural values in business science and technology, and economic challenges posed by rapid business IT. Also examines the workings of major components of information technology used in business today. (4 units)

School of Engineering

Mathematics
(Four quarters of Calculus and Analytic Geometry and one course of Differential Equations)

Tips: Students enrolled at an institution on the semester system must take three semesters of Calculus and Analytic Geometry. Students interested in Bioengineering must take a Differential Equations course equivalent to AMTH 106, not Math 22 and probably want to wait to take it at SCU.

SCU Math 11 - Calculus and Analytic Geometry I Course Description:
Differentiation and applications, introduction to integration. Prerequisite: Four years of high school mathematics (including trigonometry) or satisfactory grade in MATH 9. If MATH 9 (Precalculus) is taken, a grade of C- or higher is strongly recommended before taking MATH 11. (4 units)

SCU Math 12 - Calculus and Analytic Geometry II Course Description:
Continuation of 11. Methods and applications of integration, transcendental functions. *Prerequisite:* MATH 11 or equivalent. A grade of C- or higher in MATH 11 is strongly recommended before taking MATH 12. (4 units)

Individual College Requirements

School of Engineering (continued)

Mathematics (continued) **(Four quarters of Calculus and Analytic Geometry and one course of Differential Equations)**	***SCU Math 13 - Calculus and Analytic Geometry III Course Description:*** Infinite series, vectors, vector functions, quadric surfaces. *Prerequisite*: MATH 12 or equivalent. A grade of C- or higher in MATH 12 is strongly recommended before taking MATH 13. (4 units) ***SCU Math 14 - Calculus and Analytic Geometry IV Course Description:*** Infinite series, multiple integrals, line integrals, Green's theorem. Prerequisite: MATH 13 or equivalent. A grade of C- or higher in MATH 13 is strongly recommended before taking MATH 21. (4 units) ***SCU Math 22 - Differential Equations Course Description:*** Use of series, numerical, and Laplace transform methods in solving differentialequations. Applications. *Prerequisite:* Math 21. (4 units)
Natural Science Courses: Chemistry **(One term; not required for Web Design & Engineering majors)**	**Tips:** Students must take the first quarter (or semester) of the Chemistry series at their institution. A general survey course or one that serves as a prerequisite for the series at your school will not fulfill this requirement. ***SCU Chemistry 11 – General Chemistry I Course Description:*** Topics include chemical properties and reactions, thermochemistry, stoichiometry, quantitative problem-solving, and an introduction to ionic and covalent chemical bonding. Laboratory 3 hours per week. (5 units)
Physics **(Three quarters of Physics for Scientists and Engineers EXCEPT Web Design & Engineering majors who do not need Physics; Electrical Engineers must take a fourth quarter equivalent to SCU's Physics 34 or finsh third semester elsewhere).**	**Tips:** Students must take the calculus-based series if there are two series to choose from at their institution. Please note that Physics 32 and 33 have significant lab components. ***SCU Physics 31 - Physics for Scientists and Engineers I Course Description:*** Measurement. Vectors. Straight-line kinematics. Kinematics in two dimensions. Laws of inertia, mass conservation, and momentum conservation. Center-of-mass and reference frames. Force. Newtonian mechanics and its applications. Work and kinetic energy. Potential energy and energy conservation. Rotational dynamics. Statics*Prerequisite:* Math 11. (Math 11 may be taken concurrently.) The PHYS 31/32/33 sequence and the PHYS 11/12/13 sequence cannot both be taken for credit. (4 units) ***SCU Physics 32 - Physics for Scientists and Engineers II Course Description:*** Simple harmonic motion. Gravitation. Kepler's laws. Fluids. Waves. Thermal properties and kinetic theory of gases. Thermodynamics. Geometrical optics. Interference, diffraction, and polarization. *Prerequisites:* Math 12 and Physics 31. (Math 12 may be taken concurrently.) The PHYS 31/32/33 sequence and the PHYS 11/12/13 sequence cannot both be taken for credit. (4 units) (4 units) ***SCU Physics 32L - Physics for Scientists and Engineers II Laboratory:*** Measurement theory. Statistical reduction of data. Computer graphing techniques. Experiments directly related to Newton's Laws and to conservation laws. Experiments in periodic motion. Mechanical equivalent of heat. Use of oscilloscope. Lab quizzes. *Prerequisite:* Physics 32 (usually taken concurrently). (1 unit) ***SCU Physics 33 - Physics for Engineers and Scientists III Course Description:*** Electrostatics. Gauss's law. Potential. Capacitance. Electric current. Resistance. Kirchhoff's rules. DC circuits. AC circuits. Magnetic force. Electromagnetic induction. (4 units).

Individual College Requirements

School of Engineering (continued)

Physics (continued)

SCU Physics 33L - Physics for Scientists and Engineers III Laboratory:
Experiments with simple circuits involving capacitors and resistors. Experiments in magnetism and circuits involving inductors. Geometrical optics and computer ray tracing. Lasers. Lab quizzes. Prerequisite: Physics 33 (usually taken concurrently). (1 unit)

SCU Physics 34 - Physics for Scientists and Engineers IV Description:
Special relativity. Historical development of modern physics: black body radiation, photoelectric effect, Compton scattering, X-rays, Bohr atom, DeBroglie wavelength, Heisenberg uncertainty principle. Quantum waves and particles. Schrodinger equation. Nuclear structure and decay. Statistical physics. Solids. Semiconductors. Laboratory (Young). Winter quarter*Prerequisite:* Physics 33. (5 units)

Engineering Courses:

Tips: Pay careful attention to course prerequisites in order to be prepared to have requirements necessary to enroll in specific classes after you transfer to SCU.

Introduction to Engineering
(One course)

Tips: Not all Introduction to Engineering courses will transfer as SCU's Introduction to Engineering as it is a course that partially helps meet a core requirement specific to SCU. Please work with Engineering School directly to discuss this course credit upon acceptance.

SCU General Engineering 1 – Introduction to Engineering Course Description:
Introduction to the different engineering disciplines. Interdisciplinary aspects of engineering. Engineering professionalism, ethics and civic engagement. (1 unit)

Programming Requirements by major

Bioengineering: COEN 44
Civil Engineering: CENG 15
Computer Science & Engineering: COEN 11, 12
Electrical Engineering: COEN 12, 44
General Engineering: COEN 10
Mechanical Engineering: COEN 44
Web Design & Engineering: COEN 10, 11, 12

SCU Computer Engineering 10 – Introduction to Programming Course Description: Overview of computing. Introduction to program design and implementation: problem definition, functional decomposition, and design of algorithms in PHP and C: variables, data types, control constructs, arrays, strings, and functions. Program development in the Linux environment: editing, compiling, testing, and debugging. Credit is not allowed for more than one introductory class such as COEN 10, COEN 44, CSCI 10, or OMIS 30. (4 units)

SCU Computer Engineering 11 – Advanced Programming Course Description: The C Language: structure and style. Types, operators, and expressions. Control flow. Functions. Pointers, arrays, and strings. Structures and dynamic memory allocation. I/O and file processing. Special operators. Recursion and threads. The Unix environment.*Prerequisite:* Previous programming experience and/or an introductory programming course, such as COEN 010 with a grade of C- or better, CSCI 10, or OMIS 30. (4 units)

Individual College Requirements

School of Engineering (continued)

Programming Requirements by major (continued)

Bioengineering: COEN 44

Civil Engineering: CENG 15
Computer Science & Engineering: COEN 11, 12
Electrical Engineering: COEN 12, 44
General Engineering: COEN 10
Mechanical Engineering: COEN 44
Web Design & Engineering: COEN 10, 11, 12

SCU Computer Engineeering 12 - Abstract Data Types and Data Structures Course Description:
Data abstraction: abstract data types, information hiding, interface specification. Basic data structures: stacks, queues, lists, binary trees, hashing, tables, graphs; implementation of abstract data types in the C language. Internal sorting: review of selection, insertion, and exchange sorts; quicksort, heapsort; recursion. Analysis of run-time behavior of algorithms; Big-O notation. Introduction to classes in C++. Prerequisite: COEN 11 with a grade of C- or better or COEN 44. Recommended co-requisite: COEN 19 or MATH 51. Credit not allowed for more than one introductory data structures class, such as COEN 12 or CSCI 61.

SCU Computer Engineering 44 -- Applied Programming Course Description:
Introduction to computer operating systems. Elements of computer programming in C, including input/output, branching and loops, iterative solutions, function definition and invocation, macros, memory allocation. and top-down design. Programming of elementary mathematical operations. Application to engineering problems. Co-requisites: Math 14 (4 units)

SCU Civil Engineering 15 -- Computer Applications in Civil Engineering Course Description:
Computer-based methods for technical problem solving. Introduction to some of the basic features in spreadsheet and math analysis programs to aid engineering solutions Visual Basic programming in a spreadsheet environment. Graphical presentation o technical data Autocad basics. Laboratory. (4 units)

Circuits
(One course)

Tips: Your circuits course must have a laboratory component in order to transfer in as our Electrical Engineering 50. Pay careful attention to course prerequisites in order to be prepared to have requirements necessary to enroll in specific classes at SCU.

SCU Electrical Engineering 50 - Electric Circuits I Course Description:
Physical basis and mathematical models of circuit components and energy sources. Circuit theorems and methods of analysis applied to DC and AC circuits. Laboratory. *Prerequisite:* PHYS 33. (5 units)

Graphical Communication in Design
(One course; not required for Computer Engineeering majors)

SCU Mechanical Engineering 10 - Graphical Communication in Design Course Description:
Introduction to the design process and graphical communications tools used by engineers. Documentation of design through freehand sketching and engineering drawings. Basic descriptive geometry. Computer-aided design as a design tool. Conceptual design of individual projects presented in poster format. Computer laboratory. (5 units)

Statics
(One course; not required for Computer Engineering majors)

SCU Civil Engineering 41 - Mechanics I Statics Course Description:
Resolution and composition of force systems and equilibrium of force systems acting on structures and mechanisms. Distributed forces. Friction. Moments of inertia. *Prerequisite:* Physics 31. (4 units)

Strength of Materials
(One course; not required for Computer and Electrical Engineering majors)

SCU Civil Engineering 43 - Mechanics III Strength of Materials Course Description:
Analysis of stresses and strains in machines and structural members. Axial forces, torsion, bending, shear under individual and combined loads. Stability of columns. Introduction to energy methods.. Laboratory*Prerequisite:* CENG 41. (5 units)

Suggested Course Plan for Science Majors

It is important if students know they will be pursuing a degree within Natural Science to complete as many science requirements as possible prior to attending Santa Clara University. Doing so will allow them to begin their upper-division course work during their Junior year and help ensure graduating in a timely manner. The guide below outlines the specific lower-division course requirements Natural Science majors at SCU. You will also utilize the other portion of the guide outlining the core requirements for the College of Arts & Sciences to selec classes to round out your course load.

Biology	**Tips: Biology** majors at SCU are required to take Biology 21 through 25; **Biochemistry** majors are required to take Biology 21, 24 and 25; **Public Health Science** majors are required to take 21, 22, 24 and 25. ***SCU Biology 21 - Introduction to Physiology Course Description:*** Introduction to general principles underlying homeostasis, and the relationship of anatomical form to biological function. The course will introduce sutdents to the organization and function of cells, cellular metabolism, energy, nutrition, regulation, communication, gas exchange, circulation, and osmoregulation. *Prerequisite:* Completion of or concurrent enrollment in CHEM 11. ***SCU Biology 22 - Introduction to Evolution & Ecology Course Description:*** Introduction to key concepts in evolution and ecology, including Mendelian and population genetics, natural selection and adaptation, phylogenetics and biodiversity, demography, and interactions among organisims and their environments. *Prerequisites:* BIOL 21 and completion of or concurrent enrollment in CHEM 12. ***SCU Biology 23 - Investigations in Evolution & Ecology L & L Course Description:*** Introduction to experimental and statistical apporaches used in modern ecological and evolutionary studies, with an emphasis on experimental design, data analysis, interpretation and presentation. Builds on concepts presented in BIO 22. Fieldwork and laboratory exercises (30 hours) will take advantage of the diversity of local terrestrial and marine ecosystems. *Prerequisites:* BIOL 22 and completion of or concurrent enrollment in CHEM 13. ***SCU Biology 24 - Introduction to Cellular and Molecular Biology Course Description:*** An introduction to the cell and molecular fundamentals necessary for life. Topics include macromolecular structure, enzyme function, membrane structure and physiology, metabolism and bioenergetics, the cell cycle, and DNA replication, transcription and translation. *Prerequisites:* BIOL 21 and completion of or concurrent enrollment in CHEM 31. ***SCU Biology 25 - Investigations in Cellular & Molecular Biology L & L Course Description:*** An introduction to experimental methods for studying the cellular and molecular basis of life. Builds on the concepts covered in Biology 24. Topics include enzyme function and kinetics, cell reproduction, Mendelian and molecular genetics, and molecular biology. The topics are explored through laboratory work, with emphasis placed on the analysis, interpretation, and presentation of experimental data. Laboratory 30 hours. *Prerequisites:* BIOL 24 and completion of or concurrent enrollment in CHEM 32.
Chemistry	**Tips:** All science majors must take one full year of General Chemistry followed by a full year of Organic Chemistry .
Physics	**Tips:** Most Biology and Public Health Science majors take Physics during their Junior year at SCU. It is helpful for Chemistry and Biochemistry majors to take Physics prior to the start of their Junior year. Students may take a year of either calculus or non-calculus based Physics to satisfy this requirement.