POLYTECHNIC UNIVERSITY
SAN JUAN • ORLANDO • MIAMI

Undergraduate School

Bachelor of Arts in Computer Science **(BACS)**

121 credit hours

General Education Requirement
30 credit hours

Computer Science Foundation
12 Credit hours

Electives
27 Credit Hours

Core Requirements
25 Credit Hours

CEC 3000 – Object Oriented Programming (C/C++) I
CEC 3070 – Visual Basic Programming
CEC 3300 – Object Oriented Programming (C/C++) II
ETH 3020 – Contemporary Social Problems in Computers & Technology
ETH 3050 – Ethical & Legal Aspects of Computers & Technology
MAT 2000 –Calculus I
MAT 3400 – Discrete Mathematics
Computer Science Elective – 3000 Level

Academic Track

27 Credit Hours

CEC 3650 – Data Structures
CEC 4000 – Database Systems
CEC 4050 – Data Communications
CEC 4120 – Assembly Programming Language
CEC 4200 – Internet Programming
CEC 4650 – Software Engineering I
CEC 4710 – Computer Science Senior Project I
CEC 4750 – Design and Analysis of Algorithms
Computer Science Elective (3 credit hours)

Bachelor of Arts in Computer Science
Course Descriptions
121 Credit Hours

General Education Courses – 30 Credit Hours

Humanities - 12 Credit Hours

ARH 1000-Art Appreciation
A chronological study of the visual arts from prehistory to modern day. Students will discover the visual arts as an important social force throughout history. (3 credits)

***ENC 1101-English Composition I**
This is a required general education course in college-level writing. Emphasis is placed on unified, coherent, and organized essay writing. Sentence and paragraph structure and writing fundamentals will also be reviewed. (3 credits)

***ENC 1102-English Composition II**
This is a required general education course in college level writing and builds on the foundation of English Composition I. Further development of the students' skills in composition, essay, communication, and research are included. Prerequisite: ENC 1101. (3 credits)

HUE 1999-Selected Topics in Humanities
In-depth, intensive study of selected topics in the area of Humanities. If different topics are studied, this course may be taken twice for credit. (3 credits)

HUM 1020-Humanities
A basic approach to the creative ideas, works, and accomplishments of various cultures from the areas of art, drama, music, and literature. (3 credits)

LIT 2411-Literature and Culture Issues
In this course the student will delve into the basics of literature. The creation of imaginative literature will be reviewed as well as the aesthetic value. Consideration will be given to techniques and theories with the focus on practical criticism. Several genres and literary periods will be studied. (3 credits)

MUL 1010-Music Appreciation
A chronological study of music from prehistory to modern day. Students will discover music as an important social force throughout history. (3 credits)

SPC 1026-Fundamentals of Speech Communication
This course reviews the oral communication skills necessary for success in the student's personal, professional and educational settings. The student will develop appropriate communication behavior. (3 credits)

SPN 1120-Elementary Spanish I
A course designed for beginners to acquire proficiency in the basic skills of Spanish: listening/understanding, speaking, reading and writing. Emphasis is placed on vocabulary and pronunciations. (3 credits)

SPN 1121-Elementary Spanish II
A continuation of Elementary Spanish I, this course is designed to take the beginning Spanish-speaking learner to the next level. Continued emphasis is placed on listening/understanding, speaking, reading and writing. Prerequisite: SPN 1120. (3 credits)

Social Sciences – 9 Credit Hours

PSY 2012-Introduction to Psychology
This course is designed to be an overview of the field of psychology. It provides a basic understanding of human behavior. (3 credits)

SSE 1999-Selected Topics in the Social Sciences
In-depth, intensive study of selected topics in the area of Social Sciences. If different topics are studied, this course may be taken twice for credit. (3 credits)

SYG 2000-Introduction to Sociology
An overview of society with emphasis on the relationships between human culture and the individual. It looks at cultural norms, the organization of society, human behavior in groups, social institutions, and the implications of social change. (3 credits)

WOH 2012-World Civilization I
A survey course emphasizing world civilizations from the prehistoric period to the 18th century. Discussion traces events which have shaped our cultural history. (3 credits)

Mathematics/Sciences – 9 Credit Hours

CGS 1100-Computer Science
An introduction to computer fundamentals including information processing, operation, and usage of an operating system. Applications in word processing, electronic spreadsheets, electronic filing systems are presented. (3 credits)

***MAC 1105-College Algebra**
A detailed introduction to the fundamental concepts of algebra. Topics include linear and quadratic equations, graphing, functions, inequalities, rational expressions, radicals, and system of equations. The course emphasizes critical thinking and problem solving skills. (3 credits)

MSE 1999-Selected Topics in Mathematics or Sciences
In-depth, intensive study of selected topics in the areas of Mathematics or Sciences. If different topics are studied, this course may be taken twice for credit. (3 credits)

PSC 1121-Physical Science
A general study of the common phenomena, concepts and principles selected from astronomy, physics and chemistry. (3 credits)

*** Required**

Computer Science Foundation – 12 Credit Hours

CGS 2405-Intermediate Programming in C Language
An advanced application programming course using the C language. Emphasis will be on the design and use of structure computer algorithms for problem solving using "C". Topics covered will include the design of independent modules, processing of text data as input, advanced sorting techniques, various file handling techniques, advanced data manipulation and data structures. Prerequisite: CGS 1100. (3 credits)

BSC 1005-Introduction to Biology
Selected principles in biological science, including the cell concept, the organization of multi-cellular systems, plants and animals as organized systems, and man in relation to his environment. (3 credits)

CHM 1025-Introduction to Chemistry
Elementary principles of modern chemistry, including concepts of atomic and molecular structure, chemical bonding, stoichiometry, and the properties of solutions. Prerequisite: MAC 1105. (3 credits)

MAC 1147-Pre-Calculus Algebra and Trigonometry
This covers topics in Algebra and Trigonometry including linear and quadratic equations, solutions of triangles and complex numbers, rational expressions, functions, and radian measure. Prerequisite: MAC 1105. (3 credits)

Core Curriculum – 25 Credit Hours

CEC 3000-Object Oriented Programming (C/C++) I
Introduces students to computers; Algorithm development, UNIX, and C++ are discussed in detail. The introduction covers top down analysis, problem analysis, flow charts, and pseudocode. Structured programming and development and debugging are also emphasized. C++ coverage includes variables, data types, operators, and functions. Prerequisite: MAT 2000 or MAC 1105. (3 credits)

CEC 3070-Visual Basic Programming
This course introduces the student to Visual Basic. Course covers the fundamentals of visual programming in Visual Basic. Topics discussed cover: variables and operators, using decision structures, loops and timers, strings, modules, procedures, and arrays. Prerequisite: CEC 3000. (3 credits)

CEC 3300-Object Oriented Programming (C/C++) II
The course continues with the development of programming skills using C++. It emphasizes modular program design, arrays, and pointer usage. Structured data types (arrays, structures, and linked list) and dynamic storage is introduced. The course presents some object-oriented concepts. Prerequisite: CEC 3000. (3 credits)

ETH 3020-Contemporary Social Problems in Computers and Technology
Study and analysis of contemporary social problems that affect the engineering profession: e.g. ethical issues, conservation of the environment, restriction of financial resources, and possible solutions to these problems. (3 credits)

ETH 3050-Ethical and Legal Aspects of Computers and Technology
This course introduces students to the social, legal and moral aspects of computing, and the dilemmas that result from the evolution of computer technology. Course contents include ethical theory, decision making, professional code of ethics, "hacking" and computer crime, law enforcement, privacy and intellectual property issues, as well as environmental/health issues. (3 credits)

MAT 2000-Calculus I
Limit, the derivative and its applications; finding derivatives by means of rules; chain rule, higher order derivatives; differentials; maxima and minima; related rates of changes; curve sketching using derivatives, definite and indefinite integrals, integrations; L'Hospital Rule and area under a curve. Prerequisite: MAC 1140. (4 credits)

MAT 3400-Discrete Mathematics
Includes the study of functions of several variables, partial derivatives, multiple integrals and their applications, vector analysis and surface integrals. Stoke's, Green's, and Gauss's Theorems; convergence and divergence of sequences and series. Prerequisite: MAC 1114 or MAT 3100. (3 credits)

Computer Science Elective – Department directed Elective. (3 credits)

Academic Track Curriculum – 27 Credit Hours

CEC 3650-Data Structures
The course covers the understanding of data structures and programming logic and their implementation using C++ or another similar language. The course emphasizes on recursion, and the use of pointers, lists, stacks, queues, and trees. Searching and sorting techniques are also discussed. Several programs are assigned. Prerequisite: CEC 3300 or MAT 2000. (3 credits)

CEC 4000-Database Systems
The course begins with an overview of the concepts, role, nature and purpose of database systems and computers in the application environment. It presents the relational model (as the primary design tool for today's database systems), hierarchies and SQL. The course explores database constraints from the standpoint of integrity. Prerequisite: CEC 3650. (3 credits)

CEC 4050-Data Communications
This course is concerned with the exchange of data between two directly linked devices. The key aspects of transmission, interfacing, link control, and data transfers are examined. The physical and data link layers are discussed. Prerequisite: CEC 3300. (3 credits)

Academic Track Curriculum – 27 Credit Hours
(Continued)

CEC 4120-Assembly Programming Language
This course introduces students to the fundamental principles of machine language. Basic concepts such as number or data representation (binary, hexadecimal and others), branching and looping, memory organization, operands, instruction cycle, addressing modes, exception handling, etc. are introduced. Prerequisite: CEC 3300. (3 credits)

CEC 4200-Internet Programming
The course introduces the student to JAVA programming. How to create applets in JAVA; JAVA applets vs. autonomous programs; simple mathematical operations with JAVA applets; how to force JAVA applets to make decisions; how to make JAVA applets repeat one or more instructions; use of functions to simplify the applets; interaction with HTML and other topics. Prerequisite: CEC 3300 (3 credits)

CEC 4650-Software Engineering I
This course presents an engineering approach to the development of large software development projects. The course explains the successive steps of requirements analysis, specifications, designs, coding, debugging and testing, maintenance, and thorough documentation. Prerequisite: CEC 4000 (3 credits)

CEC 4710-Computer Science Senior Project I
Design of projects based on open-minded requirements. Projects will be selected to cover most areas of interest (i.e. Computer Software, Database Systems, investigative research based on issues that concern computer science and technology etc.). Projects will be selected in accordance with the student's area of interest. Prerequisite: Senior Standing. (3 credits)

CEC 4750-Design and Analysis of Algorithms
This course covers issues that arise in the analysis and design of algorithms used for solving computational problems. A number of common algorithm design paradigms and examples are presented and explained. Algorithm design issues are contemplated. Computability and computational tractability concepts are introduced. The importance of time and space requirements are greatly considered as the student designs algorithms to solve computational problems. Prerequisite: CEC 3650. (3 credits)

Computer Science Elective – Department directed Elective. (3 credits)

Electives – 27 Credit Hours
Department Directed Elective Courses