MASTER OF SCIENCE IN APPLIED PHYSICS AND COMPUTER SCIENCE FIVE-YEAR PROGRAM

This five-year program leads to both a Bachelor of Science degree and a Master of Science in Applied Physics and Computer Science degree. By continuing an extra year to obtain the M.S., lifetime earnings and the potential for increased opportunities and job satisfaction can increase significantly. The program is very flexible and students will still receive the B.S. in their degree program once they complete the requirements, even if they do not complete the M.S. program. Interested students should talk to their advisor early in their program since course sequencing is critical to success.

Concentration Areas

M.S. - APCS Five-year students select a concentration from one of the following:

Computer Science
Computer Systems Engineering and Instrumentation
Applied Physics

Admission Requirements

Criteria for student admission into a five-year program:

a) Undergraduate cumulative GPA of 3.0 or higher. Transfer students must have earned at least 12 hours of credit at CNU with a GPA of 3.0 or higher.
b) GPA in the student's major of at least 3.0.
c) Submit satisfactory scores on one of the following exams (must be less than five years old):
   i) the SAT taken on or after March 1, 2016 a score of 1170 with at least 580 on the Evidence- based Reading & Writing section and at least 560 on the Math section;
   ii) th the SAT taken prior to March 1, 2016 a score of 1100 with at least 530 on the Verbal section and 530 on the Math section;
   iii) A minimun ACT composite score of 24, with the ACT math score no less than 22, and an English plus Reading score no less than 46;
   iv) A Graduate Record Examination (GRE) score of at least 295 for Verbal and Quantitative sections combined.
d) Two completed recommendation forms. One must be from a faculty member in the major who has taught or mentored the student in a major course or research project.
e) Students apply for admission to a five-year program by February 1 of the junior year.
f) A Program of Study or plan of the five-year program reviewed by the advisor is highly recommended.

A student admitted to the Five Year program remains an undergraduate student until undergraduate graduation. Admittance to this program does not confer graduate status. However, Five Year students do not need to request to take graduate courses as an undergraduate. In addition, they are automatically admitted to the graduate program upon graduation as long as they meet the program's requirements.

Undergraduate Program Requirements

a) To continue in the five-year program a student must maintain a 3.0 GPA, and remain in good standing by earning a grade of *B*- or better in any graduate course taken while in the undergraduate status.
b) During the senior year, the MS-APCS five-year student will enroll in up to twelve (12) graduate credit hours that will be transferred to the graduate transcript. Only the courses and the credits are posted to the graduate transcript. No grades are posted for the transferred courses. The student will be responsible for completing 120 credits for the undergraduate degree plus up to twelve graduate credits. While credit hours for graduate courses are transferred to the graduate transcript, subject to the requirements as described, those courses may still be used to meet program requirements for the undergraduate degree. For example, a physics major who otherwise has completed the minimum 120 credit hours and who takes PHYS 502 will have three hours transferred to the graduate transcript, and yet completion of PHYS 502 will meet the PHYS 402 undergraduate requirement.

c) Upon completion of the normal requirements in his/her respective undergraduate programs, a bachelor's degree will be awarded to the student.

Graduate Course Hours

Graduate credit hours taken as a five-year B.S./M.S. undergraduate are subject to the following requirements:

a) A maximum of twelve hours of graduate credit will be allowed while classified as an undergraduate.
b) All courses must be approved by the student's advisor.
c) The student will be held to the same standards in these classes as any other graduate student.
d) Upon completion of their undergraduate degree, students in the five-year program will be required to take additional graduate hours so that the number of credit hours on the graduate transcript is a minimum of 30 hours of graduate credits. A minimum of 18 hours must be earned while in graduate status.

Five-year programs are generally thesis-track programs. Five-year non-thesis students are required to take 36 credits. The non-thesis track may be an option in certain circumstances. Contact the PCSE Graduate Program Director for more information.

Example of Five-Year Program Course of Study

Undergraduate Status	
Graduate courses taken in senior year (to be moved to graduate transcript)	12 credits
Undergraduate course hours	120 credits
Total	132 credits
Graduate Status	
Graduate course hours transferred from undergraduate transcript	12 credits
Summer, Fall, Spring	18 credits
Total for MS in APCS	30 credits

M.S. APCS FIVE-YEAR PROGRAM OF STUDY WITH A CONCENTRATION IN COMPUTER SCIENCE

Academic Prerequisites

All applicants should have completed a three-semester sequence in mathematics, including at least two semesters of calculus. Programming should include a strong familiarity with a modern computer language such as Python, Java, or C++ and theory up to the level of data structures. It is assumed that these courses are at least at the level of the following texts: Anton, *Calculus*; Liang, *Java Programming*; Aho, Hopcroft and Ullman, *Data Structures*; Mano, *Computer Engineering*. Students who do not have all prerequisites may, in some cases, be allowed to take a graduate independent study course to develop the necessary background for further graduate work.

Plan of Study

To ensure a depth and focus appropriate to the master's level and student's interests, the student's Plan of Study must be approved by the Graduate Program Director.

Core Courses		**9 credits**
CPSC 501	Software System Design and Implementation (3)	
CPSC 502	Communications I (Computer Networks) (3)	
CPSC 510	Artificial Intelligence I (3)	

Concentration Courses **12 credits**

Select any four CPSC or PCSE courses from the M.S. in Applied Physics and Computer Science program (at least one must be 600 level). The courses chosen must be approved by the Graduate Program Director.

NOTE: If PCSE 579 is successfully completed three times, it is treated as if the student completed a three-credit course and will be applied as such to the graduation requirements.

Thesis		**9 credits**
PCSE 699	Thesis Research (1-9)	

Total for MS in APCS Five-year Program of Study **30 credits**

M.S. APCS FIVE-YEAR PROGRAM OF STUDY WITH A CONCENTRATION IN COMPUTER SYSTEMS ENGINEERING AND INSTRUMENTATION

Academic Prerequisites

All applicants should have completed a two-semester sequence in physics, including mechanics and at least two labs; a five-semester sequence in mathematics, including calculus, matrix methods and differential equations; programming, including data structures; a course in computer organization and architecture; and a course with a lab in circuit analysis. It is assumed that these courses are at least at the level of the following texts: Serway, *Classical and Modern Physics*; Anton, *Calculus*; Williams, *Linear Algebra with Applications*; Boyce and DiPrima, *Ordinary Differential Equations*; Liang, *Java Programming*; Aho, Hopcroft and Ullman, *Data Structures*; Mano, *Computer Engineering*; Hayt and Kemmerly, *Circuit Theory*.

Plan of Study

To ensure a depth and focus appropriate to the master's level and student's interests, the student's Plan of Study must be approved by the Graduate Program Director.

Core Courses		**9 credits**
PHYS 521	Computer Architecture (3)	
CPSC 501	Software System Design and Implementation (3)	
CPSC 502	Communications I (Computer Networks) (3)	

Concentration Courses **12 credits**

Select four courses from the M.S. in Applied Physics and Computer Science program (at least one must be 600-level). The courses must reflect the hardware and software nature of this concentration. The courses chosen must be approved by the Graduate Program Director.

NOTE: If PCSE 579 is successfully completed three times, it is treated as if the student completed a three-credit course and will be applied as such to the graduation requirements.

Listed below are some examples:

PHYS 503	Data Acquisition and Instrumentation (3)
PHYS 522	Microprocessor-based Systems (3)
PHYS 621	Digital Signal Processing (3)
CPSC 525	Object Oriented Programming and Design (3)
CPSC 550	Distributed Operating Systems (3)
CPSC 611	Communications II (3)
CPSC 621	Parallel Processing (3)

Thesis		**9 credits**
PCSE 699	Thesis Research (1-9)	

Total for MS in APCS Five-year Program of Study **30 credits**

M.S. APCS FIVE-YEAR PROGRAM OF STUDY WITH A CONCENTRATION IN APPLIED PHYSICS

Academic Prerequisites

All applicants should have completed a three-semester sequence in physics, including modern physics and at least two labs; a five-semester sequence in mathematics, including calculus, matrix methods and differential equations; programming, including data structures; and a course with a lab in circuit analysis. It is assumed that these courses are at least at the level of the following texts: Serway, *Classical and Modern Physics*; Anton, *Calculus*; Williams, *Linear Algebra with Applications*; Boyce and DiPrima, *Ordinary Differential Equations;* Liang*, Java Programming;* Aho, Hopcroft and Ullman*, Data Structures*; Hayt and Kemmerly, *Circuit Theory*.

Plan of Study

To ensure a depth and focus appropriate to the master's level and student's interests, the student's Plan of Study must be approved by the Graduate Program Director.

Core Courses		**9 credits**
PHYS 501	Models of Dynamical Systems (3)	
PHYS 504	Electromagnetic Theory (3) and	
Either		
PHYS 502 or	Quantum Physics (3) or	
PHYS 506	Thermodynamics & Statistical Physics (3)	

Concentration Courses **12 credits**

Select any four PHYS or PCSE courses from the M.S. in Applied Physics and Computer Science program, not including any course taken to fulfill the core courses requirement. CPSC 501 is also an acceptable choice. The courses chosen must be approved by the Graduate Program Director.

NOTE: If PCSE 579 is successfully completed three times, it is treated as if the student completed a three-credit course and will be applied as such to the graduation requirements.

Thesis		**9 credits**
PCSE 699	Thesis Research (1-9)	

Total for MS in APCS Five-year Program of Study **30 credits**