Master of Science in Computer Systems Engineering (MSCSE)

Objectives: The MSCSE degree program is designed to provide students with advanced knowledge and hands-on experience in computer systems engineering relating to embedded systems, ubiquitous computing, or other traditional computer engineering fields, such as network engineering, Internet technology, etc. Through the learning process, the students acquire not only knowledge in modern computer systems technologies but also the ability to design and develop real-time computer systems in modern networking and digital Internet environments. Students are encouraged to apply their knowledge and skills to course projects that match the industry trends.

Background Preparation

Students admitted into the MSCSE degree program are required to have the following background preparation. A student with any deficiency is required to clear it by either (1) taking the course at NPU and earning a grade of at least C- or higher, or (2) taking and passing a proficiency exam on the subject. The student must clear prerequisites before attempting to enroll in graduate level courses.

1. Engineering Mathematics: MATH201, MATH208;
2. Computer Engineering Subjects: CE305; CS204 & Lab, CS230 & Lab, CS350 & Lab, CS360 & Lab, CS380;
3. The following mezzanine courses are also required for background preparation. Credit earned at NPU can meet the Electives requirement for the program: CE450LG, CS470G, CS470LG, CS480LG, P450G.

The above background preparation subjects will satisfy the prerequisites for the courses listed in the following Foundation Requirements as well as graduate courses in the study areas of embedded engineering, Internet technology, network engineering, and mobile computing. To take graduate level database courses, student needs to satisfy the following additional prerequisites: CS457/G and its lab course, CS457L/G. Instructors may update the prerequisite requirements for a concentration area based on changing technologies.

MSCSE Curriculum

A minimum of 36 semester units of graduate study are required for the MSCSE program. They include a few required foundation courses, a number of engineering courses based on the student’s selection of technical pursuit, and a required capstone course, and electives. The computer engineering coursework will develop technical skills beneficial to the student for career planning. The student also has the opportunity to take elective courses outside of computer engineering to broaden the student’s skillset.

The student must meet prerequisite requirements when taking any course. Upon clearing background preparation work, the student starts to take courses to meet the degree requirements. The student must begin his/her graduate study with the subjects listed in the Foundation Requirements section.
**Foundation Requirements** (9 units)  
(Required subjects)

- CE450G  Fundamentals of Embedded Engineering  
- CS464G  Software Design and Implementations  
- CS480G  Java and Internet Applications  

**Engineering Course Requirements** (12 units)

The student is advised to consider industry trends when selecting computer engineering courses to meet the requirements specified in this section. Before taking the Capstone Course near the end of the program, the student will take a minimum of 12 units of graduate level engineering courses and 12 units of electives. Choices of field of study include the following: embedded engineering, Internet technology, mobile computing, network engineering, and database technology.

As an example, the following courses belong to the study area of embedded engineering. Selecting any four (4) courses from the list will not only meet the Engineering Course Requirements but also help the student develop desirable skills in the embedded engineering profession:

- CS501  Advanced Structured Programming and Algorithms  
- CE521  Real-time Systems and Programming  
- CE522  Embedded Design in Networking Environment  
- CE523  Embedded Design in Device Driver Environment  
- CE530  Embedded Software Design in Linux  
- CS551  Mobile Computing for Android Mobile Devices  

Each semester when the course offering list is published, instructions on graduate level courses belonging to various concentration areas are also published along with the course offering list. Every graduate student is advised to refer to these instructions to select courses and build his/her expertise area. In addition, a cross disciplinary study of engineering concentration areas can be desirable as the fast changing computer industry has become more demanding on engineers to have multidisciplinary skillsets.

**Electives** (12 units)

The student may take any graduate-level courses, including those outside of engineering, to meet the electives requirement of 12 units. When applicable, the student may take Curricular Practicum courses and engage in practical training to work on company projects that are directly related to the student’s course of study. No more than 6 units of practicum coursework may be counted towards graduation.

**Capstone Course** (3 units)  
(A required subject)

Upon completing all or most coursework for this program, the student is required to take the capstone course and, under the guidance of the course instructor, integrate the knowledge and skills learned from all of the courses taken during the program.
EGR595 Capstone Course