

Classification of Instructional Programs (CIP); Science, Technology, Engineering, and Mathematics (STEM); and Standard Occupational Classification (SOC) in PCHEES

Introduction

The Public Centralized Higher Education Enrollment System (<https://pchees.ofm.wa.gov>) at the Educational Research and Data Center (ERDC) within the Washington State Office of Financial Management (OFM) includes data to categorize educational programs and courses with information about academic programs and fields of study. This includes three classification systems:

- [Classification of Instructional Programs](#) (CIP)

CIP provides a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions.

- [Science, Technology, Engineering, and Mathematics](#) (STEM)

“The term ‘science, technology, engineering or mathematics field’ means a field included in the Department of Education's Classification of Instructional Programs taxonomy within the two-digit series or successor series containing engineering, biological sciences, mathematics, and physical sciences, or a related field. In general, related fields will include fields involving research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences)”. 8 CFR 214.2(f)(10)(ii)(C)(2)(i)

- [Standard Occupational Classification](#) (SOC)

SOC codes are used to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. Occupations are classified into high, balanced, and low demand categories.

Data sources

Within PCHEES, each course and program record includes its CIP code as provided by the submitting institutions. The linkage to STEM and SOC (high demand versus not high demand) categorization is done using data OFM collects from three different sources:

- **CIP codes** are developed by the [National Center for Education Statistics](#) (NCES) with new releases each decade. An example from the [2020 CIP Codes](#) presents the code, title, and description for the field of electrical and electronics engineering (Figure 1).

14.1001 Electrical and Electronics Engineering. (No substantive changes)

A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of electrical and electronic systems and their components, including electrical power generation systems; and the analysis of problems such as superconductor, wave propagation, energy storage and retrieval, and reception and amplification.

Examples:

- Electrical Engineering
- Total Ship Systems Engineering
- Electrodynamic Engineering

Figure 1: An example CIP code entry for electrical and electronics engineering

The CIP codes themselves do not contain any information about their STEM or high-demand status.

- The **STEM list** is maintained by US Immigration and Customs Enforcement (ICE) as part of the Student and Exchange Visitor Program (SEVP) and Student and Exchange Visitor Information System (SEVIS) programs. The list of programs that are recognized as STEM are listed along with their CIP codes. The [July 22, 2024 STEM list](#) shows the inclusion of electrical and electronics engineering (Figure 2).

14	14.1000	Electrical, Electronics, and Communications Engineering.
14	14.1001	Electrical and Electronics Engineering.

Figure 2: ICE STEM list entry for electrical and electronics engineering

Using the course or program CIP code in PCHEES course and program data allows a linkage to STEM status.

- SOC data** are also maintained by the NCES in collaboration with the US Bureau of Labor and Statistics, which provides [six-digit SOC codes](#) as well as a [crosswalk to match with six-digit CIP codes](#). It should be noted that not all SOC codes are linked with CIP codes, for example, there is no CIP code for SOC 53-3054 = Taxi Drivers.

An example of an SOC entry for electrical and electronics engineering is shown in Figure 3.

17-2070 Electrical and Electronics Engineers

This broad occupation includes the following two detailed occupations:

17-2071 Electrical Engineers

17-2072 Electronics Engineers, Except Computer

17-2071 Electrical Engineers

Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use. Excludes "Computer Hardware Engineers" (17-2061).

Illustrative examples: Electrical Systems Engineer, Illuminating Engineer, Power Distribution Engineer

Figure 3: SOC definition for electrical and electronics engineering

An example of the crosswalk for the CIP code for electrical and electronics engineering education programs and the SOC codes for occupations is shown in Figure 4, where the CIP code 14.1001 matches the SOC code 17-2071. Note that CIP code 14.1001 matches with six

different SOC codes; that is, electrical and electronics engineering educational programs can feed into multiple different occupations.

A	B	C	D
CIP2020Code	CIP2020Title	SOC2018Code	SOC2018Title
14.0999	Computer Engineering, Other.	25-1032	Engineering Teachers, Postsecondary
14.1001	Electrical and Electronics Engineering.	11-9041	Architectural and Engineering Managers
14.1001	Electrical and Electronics Engineering.	17-2011	Aerospace Engineers
14.1001	Electrical and Electronics Engineering.	17-2061	Computer Hardware Engineers
14.1001	Electrical and Electronics Engineering.	17-2071	Electrical Engineers
14.1001	Electrical and Electronics Engineering.	17-2072	Electronics Engineers, Except Computer
14.1001	Electrical and Electronics Engineering.	25-1032	Engineering Teachers, Postsecondary
14.1002	Laser and Optical Engineering	11-9041	Architectural and Engineering Managers

Figure 4: CIP-SOC crosswalk for electrical and electronics engineering

- Finally, the list of **occupations by demand** for Washington State is maintained by the [WA Employment Security Department](#) as the [occupations in demand list](#). The list includes records for occupations in each county as well as statewide, categorizing the occupations into three classes: (1) in demand, (2) balanced, and (3) not in demand. Figure 5 shows in the March 5, 2026 data that electrical engineering occupations were in high demand across Washington State.

	Demand	SOC	Detailed Occupation Title	County	Workforce Development Area
52	In demand	17-2051	Civil Engineers	Washington State	Washington State
53	Not in demand	17-2061	Computer Hardware Engineers	Washington State	Washington State
54	In demand	17-2071	Electrical Engineers	Washington State	Washington State
55	Not in demand	17-2072	Electronics Engineers, Except Computer	Washington State	Washington State
56	Balanced	17-2081	Environmental Engineers	Washington State	Washington State

Figure 5: SOC occupation in demand status for electrical and electronics engineering

OFM Data Preparation

Data are collected annually from each source and joined based on the chain of codes:

CIP → STEM

CIP → SOC → high demand status

Data are prepared by OFM annually and made available on the [ERDC Web Site](#) as an Excel workbook ([STEM and High Demand CIP Codes.xlsx](#)). This data set includes one record per CIP field of study code per year, along with designations for STEM and high demand status.

Because a single CIP field of study code can be associated with more than one SOC occupation, and the set of occupations linked to one CIP code can have a variety of demand status designations, assigning a single occupational demand to a CIP code requires aggregating one or more records. Table 1 shows the SOC codes associated with electrical engineering from 2025-26 data, with demand status (represented numerically where highest demand = 1, balanced = 2, and lowest demand = 3), estimated employment, and wv ($demand\ status \times estimated\ employment$), used to calculate an employment-weighted demand score.

Table 1: Occupational codes, demand, and estimated employment associated with electrical engineering instructional programs

cip	soc	cip 2020 title	soc 2018 title	demand status	estimated employment	wv
141001	119041	Electrical and Electronics Engineering.	Architectural and Engineering Managers	1	4339	4339
141001	172011	Electrical and Electronics Engineering.	Aerospace Engineers	3	6008	18024
141001	172061	Electrical and Electronics Engineering.	Computer Hardware Engineers	1	2161	2161
141001	172071	Electrical and Electronics Engineering.	Electrical Engineers	1	7320	7320
141001	172072	Electrical and Electronics Engineering.	Electronics Engineers, Except Computer	2	3380	6760
141001	251032	Electrical and Electronics Engineering.	Engineering Teachers, Postsecondary	2	651	1302

A weighted mean was created as $\frac{\sum(demand_status \times estimated_employment)}{\sum estimated_employment}$. The weighted mean value for this set of SOC codes was $39,906 \div 23,859 = 1.67$, which is more than halfway toward high demand. Therefore, the CIP field of study 14.1001 Electrical and Electronics Engineering was classified as “high demand”.