Computer Programming

**Demonstrate professionalism including presentation skills, utilizing research for problem solving, working independently and in teams, being accountable and meeting deadlines.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand datatypes.
   * Develop logic structures.
   * Understand techniques required for security in computer programming.
   * Understand functions.
   * Develop loop structures.
   * Describe the features and syntax of a programming language.
   * Develop control structures.
   * Understand how software can be written to solve business problems.
   * Create, update, and process data files.
   * Use debugging and testing to create error-free code.
   * Demonstrate industry standard code development techniques.
2. CPTR1106 - Microcomputer Databases
   * Create table relationships.
   * Create database queries.
   * Define referential integrity.
   * Perform data import operations.
   * Create data entry forms.
   * Create database macros.
   * Manipulate database data.
   * Create database tables.
   * Create database reports.
   * Demonstrate database programming concepts.
   * Create and manage a switchboard.
3. CPTR1110 - Visual Basic Program I
   * Create compiled executable application files.
   * Adhere to documentation standards.
   * Demonstrate string manipulation techniques.
   * Set the properties of an object.
   * Demonstrate knowledge of control structures.
   * Code arithmetic expressions.
   * Test object-oriented event-driven applications.
   * Demonstrate application planning techniques.
   * Demonstrate industry standard code development techniques.
   * Understand the scope of both a variable and a named constant.
   * Implement data types.
   * Demonstrate industry standard graphical user interface design techniques.
   * Utilize dialog boxes.
   * Utilize order of precedence rules.
   * Explain the difference between syntax and logic errors.
4. CPTR1115 - COBOL Programming
   * Write code to post to a transaction record program.
   * Explain file matching and update logic for a sequential file.
   * Write code to add, update, or delete a relative file record.
   * Understand the uses of switches, accumulators, and work area fields.
   * Describe the difference between a subscript and an index.
   * Explain indexed file organization.
   * Code a CALL to a subprogram.
   * Code a COBOL SORT.
   * Create a transaction log report.
   * Explain how the record layout can be used to describe the related data.
   * Explain file maintenance.
   * Write a sequential file update program.
   * Understand all levels of table processing.
   * Explain the purpose of data validation.
   * Name the logic structures used in a structured program.
   * Use control structures in coding a COBOL program.
   * Demonstrate industry standard code development techniques.
   * Describe the basic organization of the four COBOL divisions.
   * Utilize condition names.
   * Differentiate single-level and multiple-level control breaks.
5. CPTR1129 - RPG Programming
   * Develop interactive screens.
   * Create, change and delete data.
   * Compile programs.
   * Develop physical files.
   * Perform calculations.
   * Produce reports.
   * Create, change, and delete data within multiple files.
   * Perform level breaks within a program.
   * Develop logic structures.
   * Use operation codes.
   * Perform CL commands.
6. CPTR1170 - Web Engineering I
   * Incorporate forms on a Web page.
   * Use current Web programming languages to create and maintain a Web page.
   * Install and configure Web page programming tools.
   * Describe the need for, and legal requirements of, Web site policies.
   * Describe components of an URL.
   * Describe the process of obtaining an Internet domain address.
   * Incorporate an e-mail link on a Web page.
   * Configure Web server software.
   * Incorporate internal and external hypertext links on a Web page.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
   * Incorporate tables on a Web page.
   * Create client-side scripting code to handle error checking in Web forms.
   * Describe the security concerns of Web server administrators.
   * Compare Web server operating systems and software.
7. CPTR2000 - Mobile Application Development
   * Create effective user interfaces for mobile devices.
   * Demonstrate effective use of documentation, tutorials and online resources to learn and use mobile development technologies.
   * Explain privacy issues related to mobile application development.
   * Explain the requirements of providing mobile commerce services.
   * Explain the process for deployment of mobile applications.
   * Demonstrate effective use of mobile technologies to build mobile applications.
   * Analyze peer-created code for constructive feedback and personal code improvement.
8. CPTR2230 - Structured Query Language
   * Specify data types in SQL.
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Specify the INSERT command in SQL to load data into tables.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
   * Specify compound conditions in a SQL select query.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * Utilize comparison operators in a SQL select query.
   * Describe integrity constraints and support.
   * View data in a table utilizing the SELECT command.
   * Create a subquery in a SQL statement.
9. CPTR2238 - Database Integration
   * Describe the database design process of producing an efficient database
   * Create multiple databases
   * Perform basic database administration tasks
   * Demonstrate data migration and integration
   * Specify requirements for gathering data
   * Use specific database software and programming languages
   * Maintain existing databases
   * Demonstrate data testing procedures
   * Describe data integrity
   * Intrepret data from queries and reports
   * Create queries
10. CSCI1121 - Computer Science I
    * Manage program input from multiple sources.
    * Understand the syntax of a high-level programming language.
    * Produce correct, clear, and concise documentation for programs.
    * Direct program output to multiple destinations.
    * Construct programs utilizing elementary data structures.
    * Determine proper control structures for implementation of problem solutions.
    * Code programs that demonstrate the use of selection structures.
    * Demonstrate effective debugging techniques.
    * Write programs that include proper use of looping structures.
    * Design algorithms to solve problems.
    * Write programs utilizing object oriented design.
    * Construct algorithms using logical and relational operators.

**2. Analyze business problems and prepare program definitions for computerized solutions.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand datatypes.
   * Use debugging and testing to create error-free code.
   * Understand functions.
   * Understand techniques required for security in computer programming.
   * Develop logic structures.
   * Understand how software can be written to solve business problems.
   * Describe the features and syntax of a programming language.
   * Develop loop structures.
   * Develop control structures.
   * Create, update, and process data files.
   * Demonstrate industry standard code development techniques.
2. CPTR1106 - Microcomputer Databases
   * Create database reports.
   * Create table relationships.
   * Manipulate database data.
   * Create database queries.
   * Create database macros.
   * Create database tables.
   * Define referential integrity.
   * Create and manage a switchboard.
   * Demonstrate database programming concepts.
   * Perform data import operations.
   * Create data entry forms.
3. CPTR1110 - Visual Basic Program I
   * Utilize dialog boxes.
   * Implement data types.
   * Create compiled executable application files.
   * Explain the difference between syntax and logic errors.
   * Utilize order of precedence rules.
   * Demonstrate industry standard graphical user interface design techniques.
   * Understand the scope of both a variable and a named constant.
   * Set the properties of an object.
   * Code arithmetic expressions.
   * Demonstrate industry standard code development techniques.
   * Demonstrate string manipulation techniques.
   * Test object-oriented event-driven applications.
   * Demonstrate application planning techniques.
   * Adhere to documentation standards.
   * Demonstrate knowledge of control structures.
4. CPTR1115 - COBOL Programming
   * Explain how the record layout can be used to describe the related data.
   * Explain the purpose of data validation.
   * Name the logic structures used in a structured program.
   * Utilize condition names.
   * Demonstrate industry standard code development techniques.
   * Code a COBOL SORT.
   * Understand the uses of switches, accumulators, and work area fields.
   * Understand all levels of table processing.
   * Explain indexed file organization.
   * Create a transaction log report.
   * Describe the basic organization of the four COBOL divisions.
   * Differentiate single-level and multiple-level control breaks.
   * Explain file maintenance.
   * Use control structures in coding a COBOL program.
   * Write a sequential file update program.
   * Describe the difference between a subscript and an index.
   * Code a CALL to a subprogram.
   * Explain file matching and update logic for a sequential file.
   * Write code to add, update, or delete a relative file record.
   * Write code to post to a transaction record program.
5. CPTR1129 - RPG Programming
   * Perform calculations.
   * Create, change and delete data.
   * Compile programs.
   * Develop interactive screens.
   * Perform CL commands.
   * Perform level breaks within a program.
   * Develop physical files.
   * Produce reports.
   * Develop logic structures.
   * Use operation codes.
   * Create, change, and delete data within multiple files.
6. CPTR1170 - Web Engineering I
   * Incorporate forms on a Web page.
   * Incorporate an e-mail link on a Web page.
   * Describe components of an URL.
   * Incorporate internal and external hypertext links on a Web page.
   * Configure Web server software.
   * Use current Web programming languages to create and maintain a Web page.
   * Create client-side scripting code to handle error checking in Web forms.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Describe the need for, and legal requirements of, Web site policies.
   * Compare Web server operating systems and software.
   * Install and configure Web page programming tools.
   * Describe the process of obtaining an Internet domain address.
   * Describe the security concerns of Web server administrators.
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
   * Incorporate tables on a Web page.
7. CPTR2000 - Mobile Application Development
   * Demonstrate effective use of mobile technologies to build mobile applications.
   * Create effective user interfaces for mobile devices.
   * Analyze peer-created code for constructive feedback and personal code improvement.
   * Design mobile applications that make use of location services.
   * Explain the differences between desktop and mobile application development.
   * Demonstrate effective use of documentation, tutorials and online resources to learn and use mobile development technologies.
   * Explain the process for deployment of mobile applications.
   * Explain the requirements of providing mobile commerce services.
8. CPTR2230 - Structured Query Language
   * Specify compound conditions in a SQL select query.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Specify the INSERT command in SQL to load data into tables.
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Describe integrity constraints and support.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * Create a subquery in a SQL statement.
   * Specify data types in SQL.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * View data in a table utilizing the SELECT command.
   * Utilize comparison operators in a SQL select query.
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
9. CPTR2238 - Database Integration
   * Describe data integrity
   * Intrepret data from queries and reports
   * Demonstrate data migration and integration
   * Describe the database design process of producing an efficient database
   * Maintain existing databases
   * Perform basic database administration tasks
   * Create queries
   * Use specific database software and programming languages
   * Specify requirements for gathering data
   * Demonstrate data testing procedures
   * Create multiple databases
10. CSCI1121 - Computer Science I
    * Understand the syntax of a high-level programming language.
    * Construct algorithms using logical and relational operators.
    * Construct programs utilizing elementary data structures.
    * Write programs utilizing object oriented design.
    * Code programs that demonstrate the use of selection structures.
    * Demonstrate effective debugging techniques.
    * Direct program output to multiple destinations.
    * Manage program input from multiple sources.
    * Produce correct, clear, and concise documentation for programs.
    * Design algorithms to solve problems.
    * Determine proper control structures for implementation of problem solutions.
    * Write programs that include proper use of looping structures.

**3. Create, document and implement computerized solutions using a variety of languages.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand datatypes.
   * Understand techniques required for security in computer programming.
   * Demonstrate industry standard code development techniques.
   * Develop logic structures.
   * Understand functions.
   * Understand how software can be written to solve business problems.
   * Describe the features and syntax of a programming language.
   * Develop loop structures.
   * Develop control structures.
   * Use debugging and testing to create error-free code.
   * Create, update, and process data files.
2. CPTR1106 - Microcomputer Databases
   * Create database reports.
   * Create and manage a switchboard.
   * Create table relationships.
   * Create data entry forms.
   * Perform data import operations.
   * Create database queries.
   * Manipulate database data.
   * Create database macros.
   * Demonstrate database programming concepts.
   * Define referential integrity.
   * Create database tables.
3. CPTR1110 - Visual Basic Program I
   * Demonstrate application planning techniques.
   * Understand the scope of both a variable and a named constant.
   * Adhere to documentation standards.
   * Explain the difference between syntax and logic errors.
   * Demonstrate knowledge of control structures.
   * Set the properties of an object.
   * Utilize order of precedence rules.
   * Demonstrate string manipulation techniques.
   * Demonstrate industry standard code development techniques.
   * Demonstrate industry standard graphical user interface design techniques.
   * Code arithmetic expressions.
   * Test object-oriented event-driven applications.
   * Utilize dialog boxes.
   * Create compiled executable application files.
   * Implement data types.
4. CPTR1115 - COBOL Programming
   * Create a transaction log report.
   * Describe the basic organization of the four COBOL divisions.
   * Code a COBOL SORT.
   * Utilize condition names.
   * Demonstrate industry standard code development techniques.
   * Explain indexed file organization.
   * Name the logic structures used in a structured program.
   * Write code to add, update, or delete a relative file record.
   * Use control structures in coding a COBOL program.
   * Explain file matching and update logic for a sequential file.
   * Write code to post to a transaction record program.
   * Describe the difference between a subscript and an index.
   * Understand the uses of switches, accumulators, and work area fields.
   * Explain the purpose of data validation.
   * Write a sequential file update program.
   * Explain file maintenance.
   * Differentiate single-level and multiple-level control breaks.
   * Understand all levels of table processing.
   * Code a CALL to a subprogram.
   * Explain how the record layout can be used to describe the related data.
5. CPTR1129 - RPG Programming
   * Perform calculations.
   * Create, change and delete data.
   * Create, change, and delete data within multiple files.
   * Develop interactive screens.
   * Compile programs.
   * Develop logic structures.
   * Use operation codes.
   * Perform level breaks within a program.
   * Perform CL commands.
   * Develop physical files.
   * Produce reports.
6. CPTR1170 - Web Engineering I
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
   * Describe the process of obtaining an Internet domain address.
   * Incorporate an e-mail link on a Web page.
   * Describe the security concerns of Web server administrators.
   * Install and configure Web page programming tools.
   * Incorporate forms on a Web page.
   * Describe the need for, and legal requirements of, Web site policies.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Create client-side scripting code to handle error checking in Web forms.
   * Describe components of an URL.
   * Incorporate tables on a Web page.
   * Incorporate internal and external hypertext links on a Web page.
   * Compare Web server operating systems and software.
   * Configure Web server software.
   * Use current Web programming languages to create and maintain a Web page.
7. CPTR2000 - Mobile Application Development
   * Explain the differences between desktop and mobile application development.
   * Explain the process for deployment of mobile applications.
   * Demonstrate effective use of documentation, tutorials and online resources to learn and use mobile development technologies.
   * Demonstrate effective use of mobile technologies to build mobile applications.
   * Create effective user interfaces for mobile devices.
8. CPTR2230 - Structured Query Language
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * Specify compound conditions in a SQL select query.
   * View data in a table utilizing the SELECT command.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * Describe integrity constraints and support.
   * Specify data types in SQL.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Create a subquery in a SQL statement.
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Specify the INSERT command in SQL to load data into tables.
   * Utilize comparison operators in a SQL select query.
9. CPTR2238 - Database Integration
   * Demonstrate data testing procedures
   * Maintain existing databases
   * Demonstrate data migration and integration
   * Perform basic database administration tasks
   * Intrepret data from queries and reports
   * Create queries
   * Specify requirements for gathering data
   * Create multiple databases
   * Use specific database software and programming languages
   * Describe the database design process of producing an efficient database
   * Describe data integrity
10. CSCI1121 - Computer Science I
    * Direct program output to multiple destinations.
    * Determine proper control structures for implementation of problem solutions.
    * Write programs utilizing object oriented design.
    * Write programs that include proper use of looping structures.
    * Construct programs utilizing elementary data structures.
    * Code programs that demonstrate the use of selection structures.
    * Produce correct, clear, and concise documentation for programs.
    * Understand the syntax of a high-level programming language.
    * Construct algorithms using logical and relational operators.
    * Design algorithms to solve problems.
    * Demonstrate effective debugging techniques.
    * Manage program input from multiple sources.

**4. Apply testing and debugging methods to assure quality and workability of finished programs.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Use debugging and testing to create error-free code.
   * Understand datatypes.
   * Demonstrate industry standard code development techniques.
   * Create, update, and process data files.
   * Develop loop structures.
   * Describe the features and syntax of a programming language.
   * Understand how software can be written to solve business problems.
   * Develop logic structures.
   * Understand functions.
   * Understand techniques required for security in computer programming.
   * Develop control structures.
2. CPTR1106 - Microcomputer Databases
   * Define referential integrity.
   * Create table relationships.
   * Create data entry forms.
   * Create and manage a switchboard.
   * Create database reports.
   * Create database tables.
   * Perform data import operations.
   * Create database queries.
   * Manipulate database data.
   * Create database macros.
   * Demonstrate database programming concepts.
3. CPTR1110 - Visual Basic Program I
   * Test object-oriented event-driven applications.
   * Explain the difference between syntax and logic errors.
   * Adhere to documentation standards.
   * Demonstrate knowledge of control structures.
   * Code arithmetic expressions.
   * Demonstrate string manipulation techniques.
   * Demonstrate industry standard graphical user interface design techniques.
   * Implement data types.
   * Create compiled executable application files.
   * Demonstrate application planning techniques.
   * Utilize order of precedence rules.
   * Set the properties of an object.
   * Understand the scope of both a variable and a named constant.
   * Utilize dialog boxes.
   * Demonstrate industry standard code development techniques.
4. CPTR1115 - COBOL Programming
   * Create a transaction log report.
   * Understand the uses of switches, accumulators, and work area fields.
   * Explain file matching and update logic for a sequential file.
   * Demonstrate industry standard code development techniques.
   * Write a sequential file update program.
   * Code a CALL to a subprogram.
   * Name the logic structures used in a structured program.
   * Use control structures in coding a COBOL program.
   * Differentiate single-level and multiple-level control breaks.
   * Utilize condition names.
   * Understand all levels of table processing.
   * Explain indexed file organization.
   * Describe the difference between a subscript and an index.
   * Explain file maintenance.
   * Write code to add, update, or delete a relative file record.
   * Explain the purpose of data validation.
   * Explain how the record layout can be used to describe the related data.
   * Write code to post to a transaction record program.
   * Code a COBOL SORT.
   * Describe the basic organization of the four COBOL divisions.
5. CPTR1129 - RPG Programming
   * Develop logic structures.
   * Use operation codes.
   * Develop interactive screens.
   * Compile programs.
   * Produce reports.
   * Perform level breaks within a program.
   * Develop physical files.
   * Create, change, and delete data within multiple files.
   * Perform calculations.
   * Create, change and delete data.
   * Perform CL commands.
6. CPTR1170 - Web Engineering I
   * Describe the security concerns of Web server administrators.
   * Describe the process of obtaining an Internet domain address.
   * Incorporate an e-mail link on a Web page.
   * Describe the need for, and legal requirements of, Web site policies.
   * Install and configure Web page programming tools.
   * Configure Web server software.
   * Compare Web server operating systems and software.
   * Incorporate forms on a Web page.
   * Describe components of an URL.
   * Create client-side scripting code to handle error checking in Web forms.
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Incorporate internal and external hypertext links on a Web page.
   * Use current Web programming languages to create and maintain a Web page.
   * Incorporate tables on a Web page.
7. CPTR2000 - Mobile Application Development
   * Create effective user interfaces for mobile devices.
   * Explain the process for deployment of mobile applications.
   * Design mobile applications that make use of location services.
   * Explain the differences between desktop and mobile application development.
   * Demonstrate effective use of mobile technologies to build mobile applications.
   * Explain the requirements of providing mobile commerce services.
8. CPTR2230 - Structured Query Language
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
   * Specify the INSERT command in SQL to load data into tables.
   * Describe integrity constraints and support.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * Create a subquery in a SQL statement.
   * View data in a table utilizing the SELECT command.
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * Utilize comparison operators in a SQL select query.
   * Specify compound conditions in a SQL select query.
   * Specify data types in SQL.
9. CPTR2238 - Database Integration
   * Create multiple databases
   * Use specific database software and programming languages
   * Demonstrate data testing procedures
   * Demonstrate data migration and integration
   * Perform basic database administration tasks
   * Specify requirements for gathering data
   * Create queries
   * Describe data integrity
   * Maintain existing databases
   * Describe the database design process of producing an efficient database
   * Intrepret data from queries and reports
10. CSCI1121 - Computer Science I
    * Direct program output to multiple destinations.
    * Understand the syntax of a high-level programming language.
    * Demonstrate effective debugging techniques.
    * Construct programs utilizing elementary data structures.
    * Write programs that include proper use of looping structures.
    * Design algorithms to solve problems.
    * Code programs that demonstrate the use of selection structures.
    * Construct algorithms using logical and relational operators.
    * Produce correct, clear, and concise documentation for programs.
    * Manage program input from multiple sources.
    * Write programs utilizing object oriented design.
    * Determine proper control structures for implementation of problem solutions.

**5. Solve problems using appropriate mathematical and/or scientific techniques.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand functions.
   * Use debugging and testing to create error-free code.
   * Understand datatypes.
   * Understand how software can be written to solve business problems.
   * Describe the features and syntax of a programming language.
   * Create, update, and process data files.
   * Develop logic structures.
   * Develop control structures.
   * Demonstrate industry standard code development techniques.
   * Understand techniques required for security in computer programming.
   * Develop loop structures.
2. CPTR1106 - Microcomputer Databases
   * Create database tables.
   * Manipulate database data.
   * Demonstrate database programming concepts.
   * Perform data import operations.
   * Create database reports.
   * Create and manage a switchboard.
   * Define referential integrity.
   * Create table relationships.
   * Create data entry forms.
   * Create database macros.
   * Create database queries.
3. CPTR1110 - Visual Basic Program I
   * Demonstrate string manipulation techniques.
   * Understand the scope of both a variable and a named constant.
   * Test object-oriented event-driven applications.
   * Code arithmetic expressions.
   * Adhere to documentation standards.
   * Demonstrate industry standard code development techniques.
   * Demonstrate industry standard graphical user interface design techniques.
   * Utilize dialog boxes.
   * Demonstrate knowledge of control structures.
   * Implement data types.
   * Create compiled executable application files.
   * Demonstrate application planning techniques.
   * Explain the difference between syntax and logic errors.
   * Set the properties of an object.
   * Utilize order of precedence rules.
4. CPTR1115 - COBOL Programming
   * Write a sequential file update program.
   * Describe the basic organization of the four COBOL divisions.
   * Write code to add, update, or delete a relative file record.
   * Understand the uses of switches, accumulators, and work area fields.
   * Understand all levels of table processing.
   * Use control structures in coding a COBOL program.
   * Explain the purpose of data validation.
   * Code a CALL to a subprogram.
   * Name the logic structures used in a structured program.
   * Explain file matching and update logic for a sequential file.
   * Explain file maintenance.
   * Code a COBOL SORT.
   * Differentiate single-level and multiple-level control breaks.
   * Explain indexed file organization.
   * Describe the difference between a subscript and an index.
   * Utilize condition names.
   * Write code to post to a transaction record program.
   * Create a transaction log report.
   * Explain how the record layout can be used to describe the related data.
   * Demonstrate industry standard code development techniques.
5. CPTR1129 - RPG Programming
   * Compile programs.
   * Perform level breaks within a program.
   * Use operation codes.
   * Create, change and delete data.
   * Develop physical files.
   * Develop interactive screens.
   * Perform CL commands.
   * Produce reports.
   * Create, change, and delete data within multiple files.
   * Perform calculations.
   * Develop logic structures.
6. CPTR1170 - Web Engineering I
   * Describe the process of obtaining an Internet domain address.
   * Use current Web programming languages to create and maintain a Web page.
   * Incorporate forms on a Web page.
   * Incorporate an e-mail link on a Web page.
   * Describe the security concerns of Web server administrators.
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
   * Describe components of an URL.
   * Install and configure Web page programming tools.
   * Describe the need for, and legal requirements of, Web site policies.
   * Configure Web server software.
   * Incorporate tables on a Web page.
   * Create client-side scripting code to handle error checking in Web forms.
   * Incorporate internal and external hypertext links on a Web page.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Compare Web server operating systems and software.
7. CPTR2000 - Mobile Application Development
   * Create effective user interfaces for mobile devices.
   * Design mobile applications that make use of location services.
   * Demonstrate effective use of mobile technologies to build mobile applications.
   * Explain the differences between desktop and mobile application development.
8. CPTR2230 - Structured Query Language
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Describe integrity constraints and support.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Utilize comparison operators in a SQL select query.
   * View data in a table utilizing the SELECT command.
   * Specify data types in SQL.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Create a subquery in a SQL statement.
   * Specify the INSERT command in SQL to load data into tables.
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
   * Specify compound conditions in a SQL select query.
9. CPTR2238 - Database Integration
   * Specify requirements for gathering data
   * Demonstrate data testing procedures
   * Describe the database design process of producing an efficient database
   * Use specific database software and programming languages
   * Create queries
   * Perform basic database administration tasks
   * Demonstrate data migration and integration
   * Describe data integrity
   * Create multiple databases
   * Maintain existing databases
   * Intrepret data from queries and reports
10. CSCI1121 - Computer Science I
    * Write programs utilizing object oriented design.
    * Manage program input from multiple sources.
    * Understand the syntax of a high-level programming language.
    * Produce correct, clear, and concise documentation for programs.
    * Demonstrate effective debugging techniques.
    * Direct program output to multiple destinations.
    * Construct algorithms using logical and relational operators.
    * Construct programs utilizing elementary data structures.
    * Write programs that include proper use of looping structures.
    * Determine proper control structures for implementation of problem solutions.
    * Code programs that demonstrate the use of selection structures.
    * Design algorithms to solve problems.

Information Technology Database Administration

**Function effectively within teams.**

**Core abilities:** **Effective Communication**

**Mappings:**

1. CPTR2224 - Linux I
   * Write simple shell scripts.
2. CPTR2234 - Linux II
   * Evaluate security solutions.

**2. Demonstrate professionalism, including presentation skills, utilizing research for problem solving, working independently and in teams, being accountable and meeting deadlines.**

**Core abilities:** **Effective CommunicationTechnologyCritical thinkingPersonal, Social, and Ethical Responsibility**

**Mappings:**

1. CPTR1170 - Web Engineering I
   * Incorporate tables on a Web page.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
   * Incorporate forms on a Web page.
2. CPTR2210 - Database Report Generation
   * Present database reports to the class to demonstrate understanding of problems.
3. CPTR2224 - Linux I
   * Manage security.
4. CPTR2245 - Enterprise Network Technologies
   * Design an enterprise network.

**3. Implement security measures while performing database administration tasks.**

**Core abilities:** **TechnologyCritical thinkingPersonal, Social, and Ethical Responsibility**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Create database reports.
   * Create database queries.
2. CPTR2210 - Database Report Generation
   * Explain current trends in database reporting.
   * Identify and analyze security and ethical issues related to database reporting.
   * Demonstrate best practices of database reporting.
3. CPTR2230 - Structured Query Language
   * Describe integrity constraints and support.
4. CPTR2234 - Linux II
   * Manage Linux security.
   * Evaluate security solutions.
5. CPTR2240 - Database Administration
   * Practice installation, configuration and management of a database management system (DBMS).
6. CPTR2260 - Advanced Structured Query Language
   * Construct subqueries.
   * Create, use and manage database views.
7. CPTR2275 - Data Analytics
   * Distinguish the components of database architecture and design.

**4. Generate database-driven reports to support business intelligence.**

**Core abilities:** **Critical thinkingTechnology**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Create database reports.
2. CPTR2210 - Database Report Generation
   * Publish database reports from eXtensible Markup Language (XML) datasets.
   * Publish database reports from relational data sets.
   * Analyze use cases of database reporting.
   * Apply querying techniques to generate reports.
   * Identify business factors involved in report distribution.
   * Explain current trends in database reporting.
   * Demonstrate best practices of database reporting.
   * Present database reports to the class to demonstrate understanding of problems.
3. CPTR2230 - Structured Query Language
   * View data in a table utilizing the SELECT command.

**5. Demonstrate appropriate ethical and security practices in handling data.**

**Core abilities:** **Personal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1170 - Web Engineering I
   * Configure Web server software.
   * Describe the security concerns of Web server administrators.
2. CPTR2210 - Database Report Generation
   * Demonstrate best practices of database reporting.
   * Identify and analyze security and ethical issues related to database reporting.
3. CPTR2234 - Linux II
   * Manage Linux security.
   * Evaluate security solutions.
   * Evaluate ethical choices.
4. CPTR2240 - Database Administration
   * Practice installation, configuration and management of a database management system (DBMS).

**6. Establish interconnectivity of databases and web services.**

**Core abilities:** **TechnologyCritical thinking**

**Mappings:**

1. CPTR1170 - Web Engineering I
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
2. CPTR2210 - Database Report Generation
   * Analyze and contrast leading software packages relating to database reporting.
3. CPTR2240 - Database Administration
   * Construct a database using object-oriented modeling.
   * Practice installation, configuration and management of a database management system (DBMS).
   * Communicate database designs and changes to appropriate stakeholders.
4. CPTR2275 - Data Analytics
   * Distinguish the components of database architecture and design.

**7. Apply testing and debugging methods to assure quality and workability of finished product.**

**Core abilities:** **TechnologyCritical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Use debugging and testing to create error-free code.
   * Demonstrate industry standard code development techniques.
2. CPTR1170 - Web Engineering I
   * Use current Web programming languages to create and maintain a Web page.
   * Install and configure Web page programming tools.
3. CPTR2210 - Database Report Generation
   * Demonstrate best practices of database reporting.
4. CPTR2224 - Linux I
   * Evaluate fault-tolerance solutions.
5. CPTR2245 - Enterprise Network Technologies
   * Develop strategies for high availability.
6. CPTR2275 - Data Analytics
   * Optimize database management systems (DBMSs) using database scalability.
   * Summarize data to reduce storage footprint.
   * Utilize data compression techniques.
7. CSCI1121 - Computer Science I
   * Design algorithms to solve problems.
   * Demonstrate effective debugging techniques.
   * Write programs that include proper use of looping structures.
   * Code programs that demonstrate the use of selection structures.
   * Determine proper control structures for implementation of problem solutions.
   * Write programs utilizing object oriented design.

**8. Devise backup and recovery measures in a database environment.**

**Core abilities:** **TechnologyCritical thinking**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Perform data import operations.
   * Demonstrate database programming concepts.
2. CPTR2224 - Linux I
   * Write simple shell scripts.
3. CPTR2240 - Database Administration
   * Apply and practice knowledge of importing and restoring data into a DBMS.
   * Apply and practice knowledge of exporting and backing up data from a DBMS.
4. CPTR2275 - Data Analytics
   * Utilize data compression techniques.

**9. Demonstrate knowledge of the software development life cycle and how the database layer is managed and administered.**

**Core abilities:** **TechnologyCritical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Demonstrate industry standard code development techniques.
2. CPTR2240 - Database Administration
   * Learn and demonstrate entity-relationship (ER) database modeling.
   * Construct a database using object-oriented modeling.
   * Practice installation, configuration and management of a database management system (DBMS).
3. CPTR2275 - Data Analytics
   * Optimize database management systems (DBMSs) using database scalability.
   * Distinguish the components of database architecture and design.
4. CSCI1121 - Computer Science I
   * Construct programs utilizing elementary data structures.
   * Design algorithms to solve problems.

Cybersecurity – AAS

**1. Use mechanisms available in an operating system to control access to resources.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Create, update, and process data files.
2. CPTR1106 - Microcomputer Databases
   * Manipulate database data.
3. CPTR1122 - Microcomputer Maintenance
   * Manage a working operating system.
   * Plan a working operating system installation.
4. CPTR2224 - Linux I
   * Manage security.
   * Manage printing.
   * Analyze graphical environments.
   * Prepare appropriate documentation.
   * Use appropriate software and commands.
   * Evaluate fault-tolerance solutions.
   * Manage application software.
   * Create Linux accounts.
   * Write simple shell scripts.
   * Manage Linux accounts.
5. CPTR2245 - Enterprise Network Technologies
   * Analyze server virtualization.
6. CSCI1110 - Informatics
   * Evaluate and understand data security methods in relation to legal and ethical requirements in selected regions of the world.
   * Evaluate data security systems in relation to current legal and social implications.
   * Analyze various Information Technology solutions for applicability in various environments.
7. CSEC2204 - Managing Directory Services
   * Employ Active Directory operation masters.
   * Demonstrate proper management of objects.
   * Demonstrate proper planning for disaster recovery.
   * Install Domain Name Services using current best practices.
   * Design an Active Directory architecture.
   * Apply software management using group policy.
   * Implement group policy on Active Directory objects.
   * Troubleshoot Active Directory.
   * Explain the role of Domain Name Services in Active Directory.
   * Implement Active Directory replication to current standards.
   * Monitor Active Directory performance.
   * Employ current authentication and authentication methods.
   * Create an Active Directory auditing plan.
8. CSEC2210 - Security Breaches and Countermeasures
   * Conduct an IT audit using current best practices.
9. CSEC2228 - Network Defense
   * Describe administrative security procedural controls.

**2. Configure infrastructure server roles.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Perform data import operations.
2. CPTR1118 - CISCO 2
   * Configure a router to connect to a network.
   * Troubleshoot a routed network.
   * Configure routing protocols.
   * Troubleshoot router connectivity.
3. CPTR2224 - Linux I
   * Manage application software.
   * Manage security.
4. CPTR2245 - Enterprise Network Technologies
   * Design an enterprise network.
   * Analyze active and passive server clustering.
   * Develop strategies for high availability.
   * Implement server virtualization.
5. CPTR2272 - Network Operating Systems
   * Describe multi-domain network structures.
   * Analyze network resource utilization.
   * Manage network accounts and groups.
   * Document network configuration.
   * Manage network services.
   * Create fault-tolerant resource plans.
   * Configure remote network access.
   * Manage security settings and policies.
   * Design network domain structures.
6. CSEC2228 - Network Defense
   * Outline network security.

**3. Investigate various countermeasures and security controls to minimize risk and exposure.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand techniques required for security in computer programming.
   * Understand how software can be written to solve business problems.
   * Create, update, and process data files.
   * Understand functions.
2. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
   * Manipulate database data.
   * Perform data import operations.
   * Create database queries.
   * Create data entry forms.
   * Define referential integrity.
3. CPTR1122 - Microcomputer Maintenance
   * Recognize microcomputer system architecture.
   * Demonstrate hardware troubleshooting skills.
   * Demonstrate operating system troubleshooting skills.
   * Examine the various types of portable microcomputers.
   * Examine the various types of computer hardware.
   * Analyze the operation of system software.
   * Analyze the operation of a microcomputer.
4. CPTR2224 - Linux I
   * Analyze graphical environments.
   * Manage application software.
   * Manage security.
   * Evaluate fault-tolerance solutions.
   * Prepare appropriate documentation.
   * Write simple shell scripts.
5. CPTR2236 - Network Security
   * Identify web-related threats.
   * Identify network security threats.
   * Examine protecting advanced communications.
   * Examine cryptography.
   * Apply IPSec policies.
   * Explore basic computer forensics methods.
   * Identify the factors in a secure network strategy.
   * Examine e-mail threats.
   * Analyze the role of firewalls, routers and switches in security.
   * Administer encryption and authentication for wireless networks.
   * Plan a patch management strategy for network servers.
   * Perform network hardening.
   * Analyze remote access security and social engineering threats.
   * Examine intrusion detection systems.
   * Practice securing web communications utilizing SSL/TLS.
   * Configure VPNs for secure sessions.
   * Identify software exploits.
   * Examine major types of attacks on information systems.
6. CPTR2245 - Enterprise Network Technologies
   * Design an enterprise network.
7. CSEC2210 - Security Breaches and Countermeasures
   * Describe threats to and vulnerabilities of systems.
   * Plan a security assessment using current practices.
   * Conduct a penetration test using current practices.
   * Conduct attacks on a controlled network.
   * Perform risk management functions.
   * Implement countermeasures for networks.
   * Utilize current tools to assess network security.
   * Demonstrate ethical behavior.
   * Perform a security assessment using current practices.
   * Analyze methods used by attackers to avoid detection.
   * Evaluate methods of non-network methods to gain network access.
   * Employ information reconnaissance techniques.
   * Conduct an IT audit using current best practices.
   * Complete written documentation of threats.
8. CSEC2228 - Network Defense
   * Interpret transmission security models.

**4. Support the ethical responsibility of ensuring software correctness, reliability and safety.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR2236 - Network Security
   * Examine major types of attacks on information systems.
   * Explore basic computer forensics methods.
   * Administer encryption and authentication for wireless networks.
   * Perform network hardening.
   * Practice securing web communications utilizing SSL/TLS.
   * Identify software exploits.
   * Examine protecting advanced communications.
   * Identify network security threats.
   * Identify the factors in a secure network strategy.
   * Analyze remote access security and social engineering threats.
2. CPTR2245 - Enterprise Network Technologies
   * Develop strategies for high availability.
3. CSCI1110 - Informatics
   * Analyze and evaluate various data transmission methods.
4. CSEC2210 - Security Breaches and Countermeasures
   * Implement countermeasures for networks.
   * Employ information reconnaissance techniques.
   * Describe threats to and vulnerabilities of systems.
   * Plan a security assessment using current practices.
   * Perform a security assessment using current practices.
   * Analyze methods used by attackers to avoid detection.
   * Perform risk management functions.
   * Perform a security assessment using current practices.
   * Evaluate methods of non-network methods to gain network access.
   * Conduct attacks on a controlled network.
   * Conduct a penetration test using current practices.
5. CSEC2228 - Network Defense
   * Interpret transmission security models.

**5. Illustrate through examples the concepts of risk, threats, vulnerabilities, attack vectors and exploits, noting there is no such thing as a perfect security.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1122 - Microcomputer Maintenance
   * Recognize microcomputer system architecture.
   * Analyze the operation of a microcomputer.
   * Analyze the operation of system software.
   * Examine the various types of computer hardware.
   * Plan a working operating system installation.
   * Demonstrate operating system troubleshooting skills.
   * Plan the building of a working computer.
2. CPTR2224 - Linux I
   * Evaluate fault-tolerance solutions.
3. CPTR2245 - Enterprise Network Technologies
   * Develop strategies for high availability.
   * Design an enterprise network.
   * Evaluate options for green technologies.
   * Implement server virtualization.
   * Analyze active and passive server clustering.
   * Analyze server virtualization.
   * Evaluate concepts for cloud computing.
   * Develop electronic documents supporting an enterprise network design.
   * Analyze the cause and cost of network downtime.
   * Analyze SAN technology.
4. CPTR2272 - Network Operating Systems
   * Create fault-tolerant resource plans.
   * Document network configuration.
   * Analyze network resource utilization.
   * Describe multi-domain network structures.
   * Design network domain structures.

**6. Analyze known security incidents to trace and document the steps in the incident.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR2224 - Linux I
   * Manage security.
   * Analyze graphical environments.
   * Write simple shell scripts.
   * Evaluate fault-tolerance solutions.
   * Use appropriate software and commands.
2. CPTR2236 - Network Security
   * Identify software exploits.
   * Configure VPNs for secure sessions.
   * Examine e-mail threats.
   * Practice securing web communications utilizing SSL/TLS.
   * Apply IPSec policies.
   * Analyze remote access security and social engineering threats.
   * Examine protecting advanced communications.
   * Plan a patch management strategy for network servers.
   * Identify network security threats.
   * Explore basic computer forensics methods.
   * Identify the factors in a secure network strategy.
   * Administer encryption and authentication for wireless networks.
   * Examine major types of attacks on information systems.
   * Examine cryptography.
   * Identify web-related threats.
   * Examine intrusion detection systems.
   * Perform network hardening.
   * Analyze the role of firewalls, routers and switches in security.
3. CPTR2245 - Enterprise Network Technologies
   * Analyze the cause and cost of network downtime.
4. CSEC2204 - Managing Directory Services
   * Create an Active Directory auditing plan.
   * Apply software management using group policy.
   * Explain the role of Domain Name Services in Active Directory.
   * Implement group policy on Active Directory objects.
   * Employ current authentication and authentication methods.
   * Demonstrate proper planning for disaster recovery.
5. CSEC2210 - Security Breaches and Countermeasures
   * Utilize current tools to assess network security.
6. HUM2236 - Technology in the Humanities
   * Students will demonstrate the importance of understanding technology both an aid to ethical and productive self expression and a hindrance to responsible social interaction.
   * Students will be able to draw connections between advances in technology and inevitabilities such as changes in how education is demanded and delivered
   * Students will be able to draw connections between advances in technology and inevitabilities such as changes in how education is demanded and delivered
   * Students will be able to identify specific philosophical, political and social movements and how they helped foster technical innovation or prevent natural technical evolution
   * Students will be able to recognize how various technologies have impacted on today&#039;s social order and anticipate advantages and difficulties associated with emerging technologies

**7. Develop technical artifacts.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Demonstrate industry standard code development techniques.
2. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
3. CPTR1122 - Microcomputer Maintenance
   * Plan a working operating system installation.
4. CPTR2224 - Linux I
   * Prepare appropriate documentation.
5. CPTR2236 - Network Security
   * Analyze the role of firewalls, routers and switches in security.
   * Examine intrusion detection systems.
   * Practice securing web communications utilizing SSL/TLS.
   * Examine e-mail threats.
   * Explore basic computer forensics methods.
   * Perform network hardening.
   * Apply IPSec policies.
   * Examine protecting advanced communications.
   * Identify network security threats.
   * Plan a patch management strategy for network servers.
   * Analyze remote access security and social engineering threats.
   * Configure VPNs for secure sessions.
   * Identify the factors in a secure network strategy.
   * Administer encryption and authentication for wireless networks.
   * Identify web-related threats.
   * Identify software exploits.
   * Examine cryptography.
   * Examine major types of attacks on information systems.
6. CPTR2245 - Enterprise Network Technologies
   * Develop electronic documents supporting an enterprise network design.
7. CSCI1110 - Informatics
   * Interpret and present data conclusions in an appropriate and logical manner for the audience.
   * Identify and select factual information to provide a potential solution to a problem.
8. CSEC2204 - Managing Directory Services
   * Create an Active Directory auditing plan.
   * Describe the structure of Active Directory.
   * Apply software management using group policy.
   * Monitor Active Directory performance.
   * Implement Active Directory replication to current standards.
   * Explain the role of Domain Name Services in Active Directory.
   * Demonstrate proper planning for disaster recovery.
   * Install Domain Name Services using current best practices.
   * Troubleshoot Active Directory.
9. CSEC2210 - Security Breaches and Countermeasures
   * Complete written documentation of threats.
   * Evaluate methods of non-network methods to gain network access.
   * Conduct attacks on a controlled network.
   * Conduct a penetration test using current practices.
   * Analyze methods used by attackers to avoid detection.
   * Plan a security assessment using current practices.
   * Employ information reconnaissance techniques.
   * Perform risk management functions.
   * Implement countermeasures for networks.
   * Describe threats to and vulnerabilities of systems.
   * Demonstrate ethical behavior.
   * Conduct an IT audit using current best practices.
   * Perform a security assessment using current practices.
   * Utilize current tools to assess network security.

**8. Examine ethical issues related to cybersecurity.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand techniques required for security in computer programming.
   * Describe the features and syntax of a programming language.
   * Understand how software can be written to solve business problems.
   * Understand datatypes.
   * Understand functions.
2. CPTR2224 - Linux I
   * Use appropriate software and commands.
3. CPTR2234 - Linux II
   * Evaluate security solutions.
   * Manage Linux security.
   * Manage system start up.
   * Manage messaging.
   * Manage server services.
   * Apply best practices to server operation.
   * Evaluate ethical choices.
   * Manage log files.
   * Manage Linux client services.
4. CSCI1110 - Informatics
   * Identify and select factual information to provide a potential solution to a problem.
   * Organize a small group to evaluate various solutions presented from the data.
   * Articulate the impact of Information Technology on personal ethics.
   * Evaluate the impact of Information Technology on a chosen field of study.
   * Evaluate and understand data security methods in relation to legal and ethical requirements in selected regions of the world.
5. CSEC2210 - Security Breaches and Countermeasures
   * Perform a security assessment using current practices.
   * Demonstrate ethical behavior.
   * Conduct an IT audit using current best practices.
   * Analyze methods used by attackers to avoid detection.
   * Complete written documentation of threats.
   * Conduct a penetration test using current practices.
   * Utilize current tools to assess network security.
   * Conduct attacks on a controlled network.
   * Perform risk management functions.
   * Describe threats to and vulnerabilities of systems.
   * Implement countermeasures for networks.
   * Plan a security assessment using current practices.
   * Employ information reconnaissance techniques.
   * Evaluate methods of non-network methods to gain network access.
6. CSEC2228 - Network Defense
   * Describe administrative security procedural controls.

**9. Write a company-wide security policy.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Use debugging and testing to create error-free code.
2. CPTR1106 - Microcomputer Databases
   * Manipulate database data.
   * Perform data import operations.
   * Define referential integrity.
   * Create database queries.
   * Create data entry forms.
   * Create table relationships.
3. CPTR1118 - CISCO 2
   * Develop an access list.
   * Configure access lists.
   * Use router command line editing.
   * Configure a router to connect to a network.
4. CPTR1122 - Microcomputer Maintenance
   * Demonstrate hardware troubleshooting skills.
   * Plan the building of a working computer.
   * Demonstrate operating system troubleshooting skills.
   * Analyze the operation of system software.
   * Examine the various types of networks.
   * Plan a working operating system installation.
5. CPTR2224 - Linux I
   * Manage application software.
6. CPTR2245 - Enterprise Network Technologies
   * Develop strategies for high availability.
   * Analyze active and passive server clustering.
   * Implement server virtualization.
   * Design an enterprise network.
   * Evaluate concepts for cloud computing.
7. CPTR2272 - Network Operating Systems
   * Create fault-tolerant resource plans.
   * Design network domain structures.
   * Configure remote network access.
   * Manage network accounts and groups.
   * Manage security settings and policies.
   * Manage network services.
   * Describe multi-domain network structures.
8. CSCI1110 - Informatics
   * Analyze various Information Technology solutions for applicability in various environments.
9. CSEC2204 - Managing Directory Services
   * Demonstrate proper planning for disaster recovery.
   * Employ Active Directory operation masters.
   * Employ current authentication and authentication methods.
   * Implement group policy on Active Directory objects.
   * Apply software management using group policy.
   * Create an Active Directory auditing plan.
   * Design an Active Directory architecture.
   * Install Domain Name Services using current best practices.
10. CSEC2210 - Security Breaches and Countermeasures
    * Analyze methods used by attackers to avoid detection.
    * Complete written documentation of threats.
    * Conduct a penetration test using current practices.
    * Conduct attacks on a controlled network.
    * Evaluate methods of non-network methods to gain network access.
    * Employ information reconnaissance techniques.
    * Perform a security assessment using current practices.
    * Plan a security assessment using current practices.
    * Conduct an IT audit using current best practices.
    * Utilize current tools to assess network security.
    * Implement countermeasures for networks.
11. CSEC2228 - Network Defense
    * Construct a packet filtering firewall.

**10. Communicate effectively and efficiently with clients, users and peers.**

**Core abilities:** **Critical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. COMM1120 - Introduction to Public Speaking
   * Incorporate diverse and ethical supporting material in the speech-making process.
   * Complete speaking evaluations with an emphasis on listening and responding ethically.
   * Complete group work with emphasis on cooperative learning and critical thinking.
   * Write and deliver speeches that demonstrate a clear, critical perspective on speech topic.
   * Demonstrate the writing and speaking process through invention, organization, drafting, revision, editing, and presentation.
   * Evaluate the effectiveness of logical and coherent arguments for the purpose of persuasion.
   * Select appropriate communication choices for specific audiences.
   * Demonstrate the appropriate use of verbal and nonverbal delivery.
   * Demonstrate the ability to make sound rhetorical choices.
2. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
3. CPTR2224 - Linux I
   * Evaluate fault-tolerance solutions.
   * Manage Linux accounts.
   * Use appropriate software and commands.
   * Prepare appropriate documentation.
4. CPTR2236 - Network Security
   * Plan a patch management strategy for network servers.
   * Analyze the role of firewalls, routers and switches in security.
   * Identify network security threats.
5. CPTR2245 - Enterprise Network Technologies
   * Design an enterprise network.
   * Develop electronic documents supporting an enterprise network design.
   * Evaluate concepts for cloud computing.
   * Develop strategies for high availability.
6. CSCI1110 - Informatics
   * Organize a small group to evaluate various solutions presented from the data.
   * Articulate the impact of Information Technology on personal ethics.
   * Evaluate and understand data security methods in relation to legal and ethical requirements in selected regions of the world.
7. CSEC2210 - Security Breaches and Countermeasures
   * Conduct an IT audit using current best practices.
8. CSEC2228 - Network Defense
   * Interpret transmission security models.

**11. Design and build virtual computing environments.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR2245 - Enterprise Network Technologies
   * Develop strategies for high availability.
   * Analyze the cause and cost of network downtime.
   * Design an enterprise network.
   * Evaluate options for green technologies.
   * Develop electronic documents supporting an enterprise network design.
   * Analyze SAN technology.
   * Evaluate concepts for cloud computing.
   * Implement server virtualization.
   * Analyze active and passive server clustering.
   * Analyze server virtualization.
   * Evaluate options for green technologies.
2. CPTR2272 - Network Operating Systems
   * Manage network services.
   * Analyze network resource utilization.
   * Create fault-tolerant resource plans.
   * Manage security settings and policies.
   * Describe multi-domain network structures.
   * Design network domain structures.
   * Configure remote network access.
   * Document network configuration.
3. CSEC2204 - Managing Directory Services
   * Monitor Active Directory performance.
   * Apply software management using group policy.
   * Install Domain Name Services using current best practices.
   * Implement Active Directory replication to current standards.
   * Create an Active Directory auditing plan.
   * Implement group policy on Active Directory objects.
   * Design an Active Directory architecture.
   * Employ current authentication and authentication methods.

**12. Construct input validation and data sanitization in applications, considering adversarial control of the input channel.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Develop loop structures.
   * Understand how software can be written to solve business problems.
   * Create, update, and process data files.
   * Understand techniques required for security in computer programming.
   * Understand how software can be written to solve business problems.
   * Use debugging and testing to create error-free code.
   * Develop logic structures.
   * Develop control structures.
   * Understand functions.
   * Demonstrate industry standard code development techniques.
   * Understand datatypes.
   * Describe the features and syntax of a programming language.
2. CPTR1118 - CISCO 2
   * Configure routing protocols.
   * Configure a router to connect to a network.
   * Configure access lists.
   * Use router command line editing.
   * Develop an access list.
3. CPTR2224 - Linux I
   * Manage security.
   * Use appropriate software and commands.
   * Write simple shell scripts.
   * Create Linux accounts.
   * Manage Linux accounts.
4. CPTR2272 - Network Operating Systems
   * Manage security settings and policies.
   * Manage network accounts and groups.
   * Configure remote network access.
5. CSEC2204 - Managing Directory Services
   * Apply software management using group policy.
   * Implement Active Directory replication to current standards.
   * Apply software management using group policy.
   * Create an Active Directory auditing plan.
   * Implement group policy on Active Directory objects.
   * Design an Active Directory architecture.
   * Install Domain Name Services using current best practices.

Information Technology – AS

**1. Apply current technical practices in the core information technologies.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Demonstrate industry standard code development techniques.
2. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
3. CPTR1122 - Microcomputer Maintenance
   * Demonstrate hardware troubleshooting skills.
4. CPTR1170 - Web Engineering I
   * Create client-side scripting code to handle error checking in Web forms.
5. CPTR1178 - Robotics
   * Build robots to meet requirements.
6. CPTR2224 - Linux I
   * Use appropriate software and commands.
   * Manage Linux accounts.
7. CPTR2236 - Network Security
   * Identify the factors in a secure network strategy.
8. CSCI1110 - Informatics
   * Analyze and evaluate various data transmission methods.

**2. Identify the requirements to provide effective solutions for organizations or individuals.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand how software can be written to solve business problems.
2. CPTR1122 - Microcomputer Maintenance
   * Plan the building of a working computer.
3. CPTR1170 - Web Engineering I
   * Describe the need for, and legal requirements of, Web site policies.
4. CPTR1178 - Robotics
   * Build robots to meet requirements.
5. CPTR2224 - Linux I
   * Manage application software.
6. CPTR2236 - Network Security
   * Identify the factors in a secure network strategy.
7. CSCI1110 - Informatics
   * Analyze various Information Technology solutions for applicability in various environments.

**3. Identify effective IT-based solutions.**

**Core abilities:** **Critical thinkingTechnology**

**Mappings:**

1. CPTR1122 - Microcomputer Maintenance
   * Analyze the operation of system software.
2. CPTR1170 - Web Engineering I
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
3. CPTR2224 - Linux I
   * Use appropriate software and commands.
4. CPTR2236 - Network Security
   * Identify the factors in a secure network strategy.
5. CSCI1110 - Informatics
   * Evaluate the impact of Information Technology on a chosen field of study.

**4. Evaluate current and emerging technologies.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1122 - Microcomputer Maintenance
   * Examine the various types of computer hardware.
2. CPTR1170 - Web Engineering I
   * Use current Web programming languages to create and maintain a Web page.
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
3. CPTR1178 - Robotics
   * Describe current automation trends.
4. CSCI1110 - Informatics
   * Evaluate the impact of Information Technology on a chosen field of study.

**5. Identify the impact of technology on individuals, organizations and society including ethical, legal and policy issues.**

**Core abilities:** **Personal, Social, and Ethical Responsibility**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand techniques required for security in computer programming.
2. CPTR1122 - Microcomputer Maintenance
   * Demonstrate operating system troubleshooting skills.
3. CPTR1170 - Web Engineering I
   * Describe the security concerns of Web server administrators.
4. CPTR1178 - Robotics
   * Examine current robot design.
5. CPTR2224 - Linux I
   * Use appropriate software and commands.
6. CPTR2236 - Network Security
   * Examine protecting advanced communications.
7. CSCI1110 - Informatics
   * Evaluate the impact of Information Technology on a chosen field of study.

**6. Demonstrate an understanding of best practices and standards.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
2. CPTR1170 - Web Engineering I
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
3. CPTR1178 - Robotics
   * Build robots to meet requirements.
4. CPTR2224 - Linux I
   * Use appropriate software and commands.
5. CPTR2236 - Network Security
   * Examine protecting advanced communications.
6. CSCI1110 - Informatics
   * Identify and select factual information to provide a potential solution to a problem.

**7. Demonstrate independent problem-solving skills.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Use debugging and testing to create error-free code.
2. CPTR1106 - Microcomputer Databases
   * Create database queries.
   * Demonstrate database programming concepts.
3. CPTR1122 - Microcomputer Maintenance
   * Demonstrate hardware troubleshooting skills.
4. CPTR1170 - Web Engineering I
   * Install and configure Web page programming tools.
5. CPTR1178 - Robotics
   * Demonstrate troubleshooting skills.
6. CPTR2224 - Linux I
   * Use appropriate software and commands.
7. CPTR2236 - Network Security
   * Perform network hardening.
8. CSCI1110 - Informatics
   * Evaluate the impact of Information Technology on a chosen field of study.

**8. Collaborate in teams to accomplish a common goal.**

**Core abilities:** **Effective Communication**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Demonstrate industry standard code development techniques.
2. CPTR1122 - Microcomputer Maintenance
   * Demonstrate operating system troubleshooting skills.
3. CPTR1178 - Robotics
   * Create robot control programs.
4. CPTR2224 - Linux I
   * Use appropriate software and commands.
5. CPTR2236 - Network Security
   * Examine cryptography.
6. CSCI1110 - Informatics
   * Organize a small group to evaluate various solutions presented from the data.

**9. Communicate effectively and efficiently with clients, users and peers.**

**Core abilities:** **Effective Communication**

**Mappings:**

1. CPTR1122 - Microcomputer Maintenance
   * Demonstrate operating system troubleshooting skills.
2. CPTR1170 - Web Engineering I
   * Describe layouts, structure, design principles, and considerations for well-designed Web sites.
3. CPTR1178 - Robotics
   * Demonstrate troubleshooting skills.
4. CPTR2224 - Linux I
   * Prepare appropriate documentation.
5. CPTR2236 - Network Security
   * Identify the factors in a secure network strategy.
6. CSCI1110 - Informatics
   * Organize a small group to evaluate various solutions presented from the data.

**10. Recognize the need for continued learning throughout one's career.**

**Core abilities:** **Critical thinking**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand techniques required for security in computer programming.
2. CPTR1122 - Microcomputer Maintenance
   * Plan a working operating system installation.
   * Plan the building of a working computer.
3. CPTR1170 - Web Engineering I
   * Evaluate Web sites using principles of good format, structure, design, and programming practices.
4. CPTR1178 - Robotics
   * Describe current automation trends.
5. CPTR2224 - Linux I
   * Use appropriate software and commands.
6. CPTR2236 - Network Security
   * Examine protecting advanced communications.
7. CSCI1110 - Informatics
   * Evaluate the impact of Information Technology on a chosen field of study.

Cybersecurity – certificate

**1. Analyze known security incidents to trace and document the steps in the incident.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR2234 - Linux II
   * Manage network communication.
   * Manage Linux security.
   * Manage messaging.
   * Apply best practices to server operation.
   * Manage Linux client services.
   * Evaluate ethical choices.
   * Manage server services.
   * Manage Internet services.
   * Manage system start up.
   * Manage log files.
   * Evaluate security solutions.
2. CSEC2210 - Security Breaches and Countermeasures
   * Perform a security assessment using current practices.
   * Implement countermeasures for networks.
   * Evaluate methods of non-network methods to gain network access.
   * Employ information reconnaissance techniques.
   * Utilize current tools to assess network security.
   * Conduct a penetration test using current practices.
   * Plan a security assessment using current practices.
   * Perform risk management functions.
   * Describe threats to and vulnerabilities of systems.
   * Analyze methods used by attackers to avoid detection.
   * Conduct attacks on a controlled network.
   * Demonstrate ethical behavior.
   * Complete written documentation of threats.
   * Conduct an IT audit using current best practices.
3. CSEC2228 - Network Defense
   * Identify personnel security practices and procedures.
   * Define cryptosecurity.
   * Outline physical security measures to current best practices.
   * Explain software security best practices.
   * Distinguish firewall cryptography strategies.
   * Complete firewall cryptography strategies.
   * Outline network security.
   * Interpret transmission security models.
   * Construct a packet filtering firewall.
   * Implement a proxy server.
   * Name the elements of TEMPEST security.
   * Describe administrative security procedural controls.
   * Indicate proper key management procedures.

**2. Use mechanisms available in an operating system to control access to resources.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand how software can be written to solve business problems.
   * Understand techniques required for security in computer programming.
2. CPTR1106 - Microcomputer Databases
   * Create database reports.
   * Perform data import operations.
   * Create database tables.
   * Create database queries.
   * Create data entry forms.
   * Define referential integrity.
   * Demonstrate database programming concepts.
   * Manipulate database data.
3. CPTR1118 - CISCO 2
   * Use router command line editing.
   * Configure a router to connect to a network.
   * Configure access lists.
   * Develop an access list.
4. CPTR2224 - Linux I
   * Use appropriate software and commands.
   * Manage application software.
   * Analyze graphical environments.
   * Manage security.
   * Manage Linux accounts.
   * Create Linux accounts.
   * Manage printing.
   * Evaluate fault-tolerance solutions.
   * Write simple shell scripts.
   * Prepare appropriate documentation.
5. CSEC2210 - Security Breaches and Countermeasures
   * Conduct a penetration test using current practices.
   * Utilize current tools to assess network security.
   * Evaluate methods of non-network methods to gain network access.
   * Perform risk management functions.
   * Demonstrate ethical behavior.
   * Conduct attacks on a controlled network.
   * Analyze methods used by attackers to avoid detection.
   * Conduct an IT audit using current best practices.
   * Implement countermeasures for networks.
   * Employ information reconnaissance techniques.

**3. Construct input validation.**

**Core abilities:** **TechnologyCritical thinkingPersonal, Social, and Ethical ResponsibilityEffective Communication**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand functions.
   * Understand how software can be written to solve business problems.
   * Use debugging and testing to create error-free code.
   * Understand datatypes.
   * Create, update, and process data files.
   * Demonstrate industry standard code development techniques.
   * Develop control structures.
   * Develop loop structures.
   * Understand techniques required for security in computer programming.
   * Describe the features and syntax of a programming language.
   * Develop logic structures.
2. CPTR1106 - Microcomputer Databases
   * Create table relationships.
   * Perform data import operations.
   * Define referential integrity.
   * Manipulate database data.
   * Create data entry forms.
   * Demonstrate database programming concepts.

**4. Install and configure firewall rules based on business policies.**

**Core abilities:** **Critical thinkingTechnologyPersonal, Social, and Ethical ResponsibilityEffective Communication**

**Mappings:**

1. CPTR1108 - CISCO 1
   * Use network monitoring tools to troubleshooting equipment failures.
   * Design and assemble small working networks.
   * Recognize the tools necessary to troubleshoot networks.
   * Recognize the components involved with assembling a network.
   * Solve network hardware and software problems.
   * Explain IP addressing and subnetting.
2. CPTR2224 - Linux I
   * Use appropriate software and commands.
   * Write simple shell scripts.
   * Manage application software.
   * Manage security.
   * Evaluate fault-tolerance solutions.
3. CPTR2234 - Linux II
   * Manage server services.
   * Manage network communication.
   * Manage log files.
   * Manage Linux security.
   * Apply best practices to server operation.
   * Evaluate security solutions.
4. CSEC2228 - Network Defense
   * Complete firewall cryptography strategies.
   * Define cryptosecurity.
   * Distinguish firewall cryptography strategies.
   * Indicate proper key management procedures.
   * Outline network security.
   * Describe administrative security procedural controls.
   * Construct a packet filtering firewall.
   * Outline physical security measures to current best practices.
   * Interpret transmission security models.
   * Implement a proxy server.

**5. Investigate various countermeasures and security controls to minimize risk and exposure.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand how software can be written to solve business problems.
   * Understand techniques required for security in computer programming.
2. CPTR1118 - CISCO 2
   * Configure access lists.
   * Use router command line editing.
   * Develop an access list.
   * Configure a router to connect to a network.
   * Analyze a router boot process.
   * Maintain router operating system.
   * Identify layer three routing protocols.
3. CPTR2224 - Linux I
   * Manage application software.
   * Use appropriate software and commands.
   * Manage security.
   * Evaluate fault-tolerance solutions.
   * Manage Linux accounts.
4. CPTR2230 - Structured Query Language
   * View data in a table utilizing the SELECT command.
   * Specify data types in SQL.
   * Utilize comparison operators in a SQL select query.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Specify compound conditions in a SQL select query.
   * Describe integrity constraints and support.
5. CPTR2234 - Linux II
   * Manage network communication.
   * Evaluate security solutions.
   * Manage log files.
   * Evaluate ethical choices.
   * Manage Linux client services.
   * Manage messaging.
   * Manage server services.
   * Manage system start up.
   * Manage Linux security.
   * Manage Internet services.
   * Apply best practices to server operation.
6. CSEC2210 - Security Breaches and Countermeasures
   * Conduct an IT audit using current best practices.
   * Evaluate methods of non-network methods to gain network access.
   * Implement countermeasures for networks.
   * Perform a security assessment using current practices.
   * Conduct a penetration test using current practices.
   * Demonstrate ethical behavior.
   * Perform risk management functions.
   * Utilize current tools to assess network security.
   * Employ information reconnaissance techniques.
   * Describe threats to and vulnerabilities of systems.
   * Conduct attacks on a controlled network.
   * Analyze methods used by attackers to avoid detection.
   * Plan a security assessment using current practices.
   * Complete written documentation of threats.
7. CSEC2228 - Network Defense
   * Construct a packet filtering firewall.
   * Identify personnel security practices and procedures.
   * Interpret transmission security models.
   * Implement a proxy server.
   * Outline physical security measures to current best practices.
   * Complete firewall cryptography strategies.
   * Describe administrative security procedural controls.
   * Outline network security.
   * Explain software security best practices.

**6. Demonstrate the use of proper SQL commands to retrieve specific data from a database.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Create database macros.
   * Create database queries.
   * Manipulate database data.
   * Create database tables.
   * Perform data import operations.
   * Demonstrate database programming concepts.
2. CPTR2230 - Structured Query Language
   * Utilize comparison operators in a SQL select query.
   * Join multiple tables in a SQL query utilizing the WHERE clause.
   * Specify the INSERT command in SQL to load data into tables.
   * Utilize the CREATE TABLE and DROP TABLE SQL commands.
   * Use the ORDER BY command and DESC operator to sort results in a SQL query.
   * Specify compound conditions in a SQL select query.
   * Utilize the COUNT, SUM, MAX, and MIN statistical functions in a SQL query.
   * Create a subquery in a SQL statement.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
   * Create group restrictions utilizing the GROUP BY and HAVING command in a SQL query.
   * View data in a table utilizing the SELECT command.
   * Specify data types in SQL.
   * Describe integrity constraints and support.
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
3. CSEC2210 - Security Breaches and Countermeasures
   * Analyze methods used by attackers to avoid detection.
   * Conduct an IT audit using current best practices.
   * Perform a security assessment using current practices.
   * Conduct a penetration test using current practices.
   * Plan a security assessment using current practices.
   * Evaluate methods of non-network methods to gain network access.
   * Utilize current tools to assess network security.

**7. Use protocol analyzers to identify information encapsulated in a data packet.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1108 - CISCO 1
   * Use network monitoring tools to troubleshooting equipment failures.
   * Demonstrate a working knowledge of the TCP/IP protocol stack.
   * Compare various networking models.
   * Design and assemble small working networks.
   * Compare the various types of networking media.
   * Explain IP addressing and subnetting.
   * Recognize the components involved with assembling a network.
   * Recognize the tools necessary to troubleshoot networks.
   * Solve network hardware and software problems.
2. CPTR1118 - CISCO 2
   * Configure routing protocols.
   * Configure a router to connect to a network.
   * Troubleshoot router connectivity.
   * Troubleshoot a routed network.
   * Develop an access list.
   * Configure access lists.
   * Identify layer three routing protocols.
3. CPTR2224 - Linux I
   * Manage security.
   * Write simple shell scripts.
   * Analyze graphical environments.
   * Manage application software.
   * Use appropriate software and commands.
4. CSEC2210 - Security Breaches and Countermeasures
   * Utilize current tools to assess network security.
   * Analyze methods used by attackers to avoid detection.
   * Employ information reconnaissance techniques.
   * Conduct a penetration test using current practices.
   * Perform a security assessment using current practices.
   * Evaluate methods of non-network methods to gain network access.
   * Conduct an IT audit using current best practices.

**8. Write scripts to perform specific functions within a host and networked computing environment.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1001 - Introduction To Programming and Scripting
   * Understand datatypes.
   * Develop logic structures.
   * Understand functions.
   * Develop control structures.
   * Understand techniques required for security in computer programming.
   * Develop loop structures.
   * Understand how software can be written to solve business problems.
   * Demonstrate industry standard code development techniques.
   * Create, update, and process data files.
   * Use debugging and testing to create error-free code.
   * Describe the features and syntax of a programming language.
2. CPTR1108 - CISCO 1
   * Design and assemble small working networks.
   * Recognize the tools necessary to troubleshoot networks.
   * Recognize the components involved with assembling a network.
   * Use network monitoring tools to troubleshooting equipment failures.
3. CPTR1118 - CISCO 2
   * Configure a router to connect to a network.
   * Troubleshoot router connectivity.
   * Configure routing protocols.
   * Develop an access list.
   * Use router command line editing.
   * Maintain router operating system.
   * Configure access lists.
4. CPTR2224 - Linux I
   * Create Linux accounts.
   * Manage security.
   * Use appropriate software and commands.
   * Write simple shell scripts.
   * Evaluate fault-tolerance solutions.
   * Manage Linux accounts.
   * Manage application software.
5. CPTR2234 - Linux II
   * Manage Linux security.
   * Manage system start up.
   * Manage network communication.
   * Manage Internet services.
   * Evaluate ethical choices.
   * Evaluate security solutions.
   * Apply best practices to server operation.
   * Manage server services.
   * Manage Linux client services.
   * Manage log files.
6. CSEC2210 - Security Breaches and Countermeasures
   * Implement countermeasures for networks.
   * Conduct a penetration test using current practices.
   * Utilize current tools to assess network security.
   * Plan a security assessment using current practices.
   * Analyze methods used by attackers to avoid detection.
   * Perform a security assessment using current practices.
   * Employ information reconnaissance techniques.
   * Conduct an IT audit using current best practices.
7. CSEC2228 - Network Defense
   * Outline network security.
   * Interpret transmission security models.
   * Describe administrative security procedural controls.
   * Construct a packet filtering firewall.

**9. Examine ethical issues related to cybersecurity.**

**Core abilities:** **Effective CommunicationCritical thinkingPersonal, Social, and Ethical ResponsibilityTechnology**

**Mappings:**

1. CPTR1106 - Microcomputer Databases
   * Demonstrate database programming concepts.
2. CPTR2230 - Structured Query Language
   * Correct data errors and delete records in a table utilizing the UPDATE and DELETE commands.
   * Specify query selection criteria utilizing the FROM and WHERE clauses.
3. CPTR2234 - Linux II
   * Evaluate ethical choices.
   * Apply best practices to server operation.
   * Manage Linux security.
   * Evaluate security solutions.
4. CPTR2236 - Network Security
   * Identify network security threats.
   * Identify software exploits.
   * Examine protecting advanced communications.
   * Identify the factors in a secure network strategy.
   * Examine major types of attacks on information systems.
5. CSEC2210 - Security Breaches and Countermeasures
   * Perform a security assessment using current practices.
   * Describe threats to and vulnerabilities of systems.
   * Employ information reconnaissance techniques.
   * Conduct an IT audit using current best practices.
   * Perform risk management functions.
   * Demonstrate ethical behavior.
6. CSEC2228 - Network Defense
   * Identify personnel security practices and procedures.
   * Explain software security best practices.
   * Outline physical security measures to current best practices.

Cisco Certificate

#### 1. Analyze networking models.

**Core abilities:** **None saved**

#### 2. Analyze networking protocols.

**Core abilities:** **None saved**

#### 3. Configure local area networks.

**Core abilities:** **None saved**

#### 4. Configure wide area networks.

**Core abilities:** **None saved**

#### 5. Define common industry terms and standards.

**Core abilities:** **None saved**

#### 6. Troubleshoot LAN/WAN systems.

**Core abilities:** **None saved**