

Fanshawe College

FIRST: Fanshawe Innovation, Research, Scholarship, Teaching

Documentation (Approvals etc...)

Cyber Security

2017

CYB1 Curriculum Modification for 2017-18

Fanshawe College

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CURRICULUM MODIFICATION REQUEST FORM

COURSE OR PROGRAM CURRICULUM "RATIONALE FOR CHANGE"

Program Requiring Changes

| | | |
|---|---|-------------------------------|
| Program Title: Cyber Security | | |
| Program Number: CYB1 | Date Submitted: 5/5/2017 | |
| Dean responsible for program: David Belford | Chair: Jim Edwards | |
| Credential Provided: <input type="checkbox"/> Declaration of Academic Achievement <input type="checkbox"/> Local Certificate <input type="checkbox"/> Ontario College Certificate <input type="checkbox"/> Diploma <input checked="" type="checkbox"/> Advanced Diploma <input type="checkbox"/> Grad Certificate <input type="checkbox"/> Degree <input type="checkbox"/> Apprenticeship | | |
| Program Intakes: <input checked="" type="checkbox"/> F <input checked="" type="checkbox"/> W <input type="checkbox"/> S Other: | Catalogue Year(s) Impacted: 2017/18 | |
| Residency Requirement: <input checked="" type="checkbox"/> Met or <input type="checkbox"/> Not Met | Date of Last Program Review: Click here to enter a date. | |
| <i>I have read the reasons for the change and...</i> | | <i>Signature and date</i> |
| Dean of Faculty (responsible for program): | <input checked="" type="checkbox"/> Approve <input type="checkbox"/> Do Not Approve | <i>D. Belford May 8/17</i> |
| Dean of Faculty (impacted by change): | <input type="checkbox"/> Approve <input type="checkbox"/> Do Not Approve | |
| Dean of Faculty (impacted by change): | <input type="checkbox"/> Approve <input type="checkbox"/> Do Not Approve | |
| Senior Vice President Academic (required for major changes and late DAs): | <input checked="" type="checkbox"/> Approve <input type="checkbox"/> Do Not Approve | <i>[Signature] May 26/17</i> |
| Director, Centre for Academic Excellence: | <input checked="" type="checkbox"/> Supports <input type="checkbox"/> Does Not Support | <i>Julie Geddes May 25/17</i> |
| Office of the Registrar: | <input checked="" type="checkbox"/> Supports <input type="checkbox"/> Does Not Support | <i>Jim Call</i> |

mapping req'd. - only level 1 & 2 provided. TS

Please answer each of the questions below, if applicable. Missing or incomplete information may delay review of the proposed changes.

1.0 Describe proposed change(s). Complete Appendix A (if necessary) and amend SDAR (Refer to Appendix C).

Rename INFO- 3130 LAMP Security to SRTY-5008 WEB Security II. LAMP is a tool that does web security but should not be reflected in the course title. Tools change and there are other tools that need to be covered in this course. This course will build on the on concepts and techniques introduced in INFO-1208 PHP Fundamentals in Level 1 and SRTY-3004 Web Security in Level 3, in order to enhance security concepts on servers that handle email and web applications. This should be a level 5 course to reflect the progression of topics in web security.

Remove INFO-5096 Managing & Budgeting Technical Projects in Level 7, (Semester 5)- this content can be covered in other courses, specifically the technical projects in Level 9, (Semester 6) INFO-5120 and INFO-5116. Replace with INFO- 5127 Network Security. This course will concentrate on managing network users and clients with active directory services and end point security solutions. Active directory and end point security are not covered in other courses and the only O/S courses are in 1st & 2nd semester which is too early for these topics. As the earlier courses were being developed it became apparent that a higher level course in Windows network security was missing.

These changes do not affect the hours in the program nor impact the staffing, Co-op, or ✓ space and technology requirements.

2.0 Reason/Rationale for Changes

2.1 The reason for the change is based on:

- A recent program review
- College Advisory Committee feedback
- Program Advisory Committee feedback
- Student feedback
- KPI results
- Accreditation or other regulatory requirements
- Shared curriculum
- Trends in the field/industry
- Other (please describe): review of courses for new program

2.2 Does the change support the College's Strategic Framework (mission, vision, values)?

- Yes
- No (If no, please explain)

2.3 What strategic goal(s) does the proposed change support?

- Goal 1 - Enrolment growth
- Goal 2 - Flexible delivery options
- Goal 3 - Premier student experience
- Goal 4 - Sustainable College life

3.0 Students

3.1 Will the change affect the cost of the program for students?

- Yes
- No

3.2 If yes, there will be an additional cost for:

- Materials (Include details):
- Equipment (Include details):
- Other (Please describe):

4.0 Program Learning Outcomes

4.1 Will the proposed change meet the Program Vocational Learning Outcomes? (Complete Appendix B and mark the changes in the mapping [e.g. red font])

- Yes
- No

4.2 Are there any implications related to progression because of pre-requisite courses (and/or co-requisite courses)?

- No
- Yes (If yes, please explain)

5.0 Relationships with Other Programs

5.1 Are any of the courses impacted by the change provided by another School (e.g., SLLS, LKSB) and/or delivered at another campus?

- No
- Yes

5.2 What Schools/Campuses will be impacted by the proposed change?

- School of Information Technology
- Lawrence Kinlin School of Business
- School of Tourism and Hospitality
- School of Health Sciences
- School of Human Services

- School of Nursing
- School of Public Safety
- School of Contemporary Media
- School of Design
- School of Language and Liberal Studies
- Norton Wolf School of Aviation Technology
- School of Applied Sciences and Technology
- Donald J. Smith School of Building Technology
- School of Transportation Technology
- Continuing Education
- Simcoe/Norfolk Regional Campus
- St Thomas/Elgin Regional Campus
- Woodstock/Oxford Regional Campus
- Huron/Bruce Regional Sites

5.3 Will the change affect pathway agreements (e.g., bridging, articulations, laddering, advanced standing) with other Fanshawe program(s) and/or other institution(s)?
(Refer to the pathway agreements listed here: <http://transferagreements.fanshawec.ca/>)

- No
- Yes (If yes, indicate when you will notify the other Fanshawe program(s) and/or other institution(s) and the Pathways Coordinator in the Centre for Academic Excellence of the change)

5.4 If this program is a Co-Operative Education program, will the proposed change impact Co-op?

- No
- Yes (If yes, consult with the Co-op office prior to submission)

6.0 Resource Implications of Proposed Changes

6.1 Will the proposed change have staffing implications?

- No
- Yes (If yes, please explain)

6.2 Will the proposed change impact any of the Enabling areas?

- No
- Yes (If yes, please explain)

6.3 Will the proposed change affect space and/or technology requirements?

- No
- Yes (If yes, please explain)

7.0 General College Requirements

7.1 Are changes consistent with Colleges policies?

- Yes
 No (If no, please explain)

7.2 Indicate:

- i) Total program hours before proposed change: 2031
 ii) Total program hours after proposed change: 2031
 iii) Level(s) in which the proposed change(s) occurs: Levels 5 & 7

7.2.1 Are the total program hours consistent with the requirements as listed below?

- Yes
 No (If no, please explain)

| | |
|---|--|
| Local Certificate - 300 hours | Ontario College Certificate - 600 hours |
| Diploma - 1200 to 1400 hours | Advanced Diploma - 1800 to 2000 hours |
| Graduate Certificate - 600 hours | |

7.3 Will the program meet the General Education requirements (Policy 2-B-02) as listed below?

- No
 Yes

| | | |
|---|--|---|
| Local Certificate, Ontario College Certificate and Graduate Certificate - none required) | Diploma - 3 required (minimum of 1 must be an elective) | Advanced Diploma - 4 required (minimum of 2 must be electives) |
|---|--|---|

7.4 Will the program have 25% distinct curriculum to meet the Residency Requirement of 25% credit units? Consider all pathway agreements (e.g., bridging, internal articulations, laddering, advanced standing) with other Fanshawe programs and/or other institutions.

- No
 Yes

Note: In accordance with POLICY NUMBER: 2-B-17 Graduation from Approved College Programs

...to be eligible for any College Credential a student must be enrolled and complete at least 25% of that program's credit units at Fanshawe College, unless stipulated differently by

other approving bodies such as the Postsecondary Education Quality Assessment Board (PEQAB).

APPENDIX A: PROPOSED CURRICULUM MODIFICATION

| Course Code | Existing DA Courses | Total Hours | Total Credits | | Course Code | Proposed DA Courses | Total Hours | Total Credits |
|-----------------------------|---|-------------|---------------|----------------------------------|--------------|---------------------|-------------|---------------|
| Level 1 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | 0 | 0 | | TOTAL | | 0 | 0 |
| Level 2 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | 0 | 0 | | TOTAL | | 0 | 0 |
| Level 3 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | 0 | 0 | | TOTAL | | 0 | 0 |
| Level 4 (Semester 4) | | | | | | | | |
| INFO-3130 | LAMP Security | 60 | 4 | rename INFO-3130 to SRTY-5008 | SRTY-5008 | Web Security II | 60 | 4 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | 60 | 4 | | TOTAL | | 60 | 4 |
| Level 5 (Semester 5) | | | | | | | | |
| INFO-5096 | Managing & Budgeting Technical Projects | 45 | 3 | replace INFO-5096 with INFO-5127 | INFO-5127 | Network Security | 45 | 3 |
| | | | | | | | | |
| TOTAL | | 45 | 3 | | TOTAL | | 45 | 3 |
| Level 6 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | 0 | 0 | | TOTAL | | 0 | 0 |

PROGRAM TOTAL 105 7

PROGRAM TOTAL 105 7

Degree Audit Report

Catalog: 2017/2018

RECEIVED

Program: CYB1
Department: ITY - Information Technology
Academic Level: PS
CCD: 9 - 6AcadSem/1800-2100hrs
Credential: Ontario College Advanced Dipl

Name: Cyber Security

MAY 15 2017

OFFICE OF THE REGISTRAR

Grade Scheme: LG2
Major: CYB1 - Cyber Security
Co-Op Indicator: Mandatory Co-op

Div: ITY - Information Technology Division

Academic Program Requirement

Total Credits: 138.00 **Residency Reqmt:** 35.00
GPA Requirement: 2.000 **Residency Reqmt GPA:** 2.000
Minimum Grade: D

Academic Requirement: CYB1.17 Cyber Security

Major: CYB1
Grade Scheme: LG2
Minimum GPA: 2.000
Minimum Grade:

Subrequirement: Level 1

Take all of the following Mandatory Courses:
 Group 1

| | | Total Hours | Total Credits | GE |
|-----------|--|------------------------|--------------------------|-----------|
| INFO-1218 | Operating Syst Fundamentals for Security | 45.00 | 3.00 | |
| INFO-1220 | Networking Fundamentals for Security | 75.00 | 5.00 | |
| INFO-1221 | Programming Fundamentals for Security | 75.00 | 5.00 | |
| INFO-1222 | Database Fundamentals for Security | 45.00 | 3.00 | |
| PHIL-1019 | Ethics | 45.00 | 3.00 | |

Group 2

TAKE WRIT-1043 OR WRIT-1034

| | | Total Hours | Total Credits | GE |
|-----------|---------------------------|------------------------|--------------------------|-----------|
| WRIT-1043 | Reason & Writing 1 for IT | 45.00 | 3.00 | |
| WRIT-1034 | Reason & Writing 1 - EAP | 60.00 | 4.00 | |

Subrequirement: Level 2

Take all of the following Mandatory Courses:

| | | Total Hours | Total Credits | GE |
|-----------|---------------------------------------|------------------------|--------------------------|-----------|
| CRIM-1036 | Cybercrime | 45.00 | 3.00 | |
| INFO-1207 | Network Components | 60.00 | 4.00 | |
| INFO-1208 | PHP Fundamentals | 45.00 | 3.00 | |
| INFO-1209 | Cryptography & Authentication Systems | 45.00 | 3.00 | |
| INFO-1210 | Securing Linux | 60.00 | 4.00 | |
| INFO-1212 | Securing Windows Systems | 45.00 | 3.00 | |
| SRTY-1021 | Cyber Security | 45.00 | 3.00 | |

Subrequirement: Level 3

Take all of the following Mandatory Courses:

Degree Audit Report

| | | Total Hours | Total Credits | GE |
|-----------|--|------------------------|--------------------------|-----------|
| COMM-3077 | Communications for IT | 45.00 | 3.00 | |
| COOP-1020 | Co-operative Education Employment Prep | 6.00 | 1.00 | |
| INFO-3127 | Network Protocols | 45.00 | 3.00 | |
| INFO-3128 | Scripting for Security | 45.00 | 3.00 | |
| SRTY-3004 | Web Security | 45.00 | 3.00 | |
| SRTY-3005 | Security Mechanisms | 45.00 | 3.00 | |
| SRTY-3007 | Auditing & Security Controls | 45.00 | 3.00 | |
| SRTY-3008 | Security Management | 45.00 | 3.00 | |

Subrequirement: Level 4

Take all of the following Mandatory Courses:

| | | Total Hours | Total Credits | GE |
|----------------------|---|------------------------|--------------------------|-----------|
| COMM-1127 | Technical Writing & Presentation | 45.00 | 3.00 | |
| CRIM-3001 | Criminology | 45.00 | 3.00 | ** |
| INFO-3126 | Wireless & Mobile | 45.00 | 3.00 | |
| INFO-3129 | Network Monitoring | 60.00 | 4.00 | |
| INFO-3130 | LAMP Security | 60.00 | 4.00 | |
| INFO-3131 | Evolving Technologies & Threats | 45.00 | 3.00 | |
| SRTY-3009 | Computational Intelligence for Security | 45.00 | 3.00 | |
| <i>Add SRTY-5008</i> | <i>Web Security II</i> | <i>60.00</i> | <i>4.00</i> | |

Subrequirement: Level 5

Gen Ed - Take a 3 credit General Education elective course

Take all of the following Mandatory Courses:

| | | Total Hours | Total Credits | GE |
|----------------------|--|------------------------|--------------------------|-----------|
| INFO-5096 | Managing & Budgeting Technical Projects | 45.00 | 3.00 | |
| INFO-5117 | Digital & Network Forensics | 45.00 | 3.00 | |
| INFO-5118 | Perimeter Defence & Design | 60.00 | 4.00 | |
| INFO-5119 | Attack Vectors & Analysis | 45.00 | 3.00 | |
| SRTY-3012 | Incidence Handling & Response | 45.00 | 3.00 | |
| SRTY-5007 | Penetration Testing | 60.00 | 4.00 | |
| <i>Add INFO-5127</i> | <i>Network Security</i> | <i>45.00</i> | <i>3.00</i> | |

Subrequirement: Level 6

Gen Ed - Take a 3 credit General Education elective course

Take all of the following Mandatory Courses:

| | | Total Hours | Total Credits | GE |
|-----------|-------------------------------------|------------------------|--------------------------|-----------|
| INFO-5116 | Research Project & Entrepreneurship | 75.00 | 5.00 | |
| INFO-5120 | Secure Network Architecture | 45.00 | 5.00 | |
| SRTY-5004 | Hacking Techniques & Exploits | 60.00 | 4.00 | |
| SRTY-5005 | Penetration Testing-Adv | 60.00 | 4.00 | |
| SRTY-5006 | Malware Analysis & Response | 60.00 | 4.00 | |

Subrequirement: Gen Ed - Electives

Take 6 General Education credits -

Normally taken in Levels 5 and 6

Subrequirement: Program Residency

Students Must Complete a Minimum of 35 credits in this program at Fanshawe College to meet the Program Residency requirement and graduate from this program

Degree Audit Report

JW Edwards
Approved By Chair/Manager:

RL Blythe
Approved by Dean:

General Education Approved By(as appropriate):

ITX May 5/17.
Department and Date:

May 8/17
Date:

Date:

TG.
May 29/17

APPENDIX E – Program Outcomes – Curriculum Map

| PROGRAM MAPPING Cyber Security | | LEVEL ONE | | | | | | LEVEL TWO | | | | | | # OF COURSES EVALUATING THE OUTCOME | |
|---|--|-----------------------------------|------------------------------------|---------------------------------|--|-----------------------|---|------------------------------|----------------------------|--------------------------|---|--------------------------|------------------------|-------------------------------------|------------------------------------|
| PROGRAM VOCATIONAL LEARNING OUTCOMES | | INFO-1220 Networking Fundamentals | INFO-1221 Programming Fundamentals | INFO-1222 Database Fundamentals | INFO-1218 Operating Systems Fundamentals | PHIL-1019 Ethics (GM) | WRIT-1043 Reasoning & Writing for IT/ WRIT-1034 Reasoning & Writing - EAP | INFO-1207 Network Components | INFO-1208 PHP Fundamentals | SRTY-1021 Cyber Security | INFO-1209 Cryptography and Authentication Systems | INFO-1210 Securing Linux | CRIM-1036 - Cybercrime | | INFO-1212 Securing Windows Systems |
| 1 - Introductory | | 1 | 1 | 1 | 1 | | | 2 | 1 | 1 | 2 | 1 | | 1 | 10 |
| 2 - Building | | 1 | 1 | 1 | 1 | | | 2 | 1 | 1 | 2 | 1 | | 1 | 10 |
| 3 - Culminating | | 1 | 1 | 1 | 1 | | | 2 | 1 | 1 | 1 | 1 | | 1 | 10 |
| The graduate has reliably demonstrated the ability to: (Source: MTCU Code) | | | | | | | | | | | | | | | |
| 1. Configure, implement, manage and secure devices and equipment considering the unique features of the computer operating systems, networks, applications and software. | | | | | | | | | | | | | | | |
| 2. Design, implement and evaluate security solutions for business processes, applications and communications to protect business resources and respond to the needs of all the internal stakeholders. | | | | | | | | | | | | | | | |
| 3. Use project management principles to implement security strategies and processes that address the organization's information security requirements. | | | | | | | | | | | | | | | |
| 4. Develop, implement and evaluate organizational security policies, standards and regulations to promote internal security. | | | | | | | | | | | | | | | |
| 5. Perform vulnerability assessments and penetration testing for infrastructures, web and applications, using both manual and automated techniques. | | | | | | | | | | | | | | | |
| 6. Evaluate and apply tools and techniques to formulate countermeasures to secure information systems against security threats. | | | | | | | | | | | | | | | |
| 7. Perform security audits and forensic analysis to evaluate the effectiveness of a security system, and identify and correct security vulnerabilities. | | | | | | | | | | | | | | | |
| 8. Monitor and analyze logs and alerts from network devices to determine the extent of a security breach and what data has been compromised. | | | | | | | | | | | | | | | |
| 9. Identify, collect, and log relevant data as evidence for a sample case within a business or in the Canadian Justice System. | | | | | | | | | | | | | | | |
| TOTAL # OF OUTCOMES EVALUATED BY EACH COURSE | | 5 | 5 | 4 | 4 | 1 | 0 | 5 | 5 | 7 | 4 | 3 | 2 | 5 | |
| GM = General Education (mandatory) G = General Education (elective) | | | | | | | | | | | | | | | |

NB - Only indicate the outcomes that are Taught & Evaluated (TE or TRE) in a course

PROGRAM COORDINATOR: Karen MacIntyre
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results:

| PROGRAM MAPPING (Name of Program) | | | | | | | | | | | | | LEVEL THREE | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|-------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PROGRAM VOCATIONAL LEARNING OUTCOMES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 - Introductory | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 - Intermediate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 - Advanced | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The graduate has reliably demonstrated the ability to: (Source: MTCU Code) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Configure, implement, manage and secure devices and equipment considering the unique features of the computer operating systems, networks, applications and software, and communications to protect business resources and respond to the needs of all the internal stakeholders. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Design, implement and evaluate security solutions for business processes, applications and communications to protect business resources and respond to the needs of all the internal stakeholders. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Use project management principles to implement security strategies and processes that address the organization's information security requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Develop, implement and evaluate organizational security policies, standards and regulations to promote internal security. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Perform vulnerability assessments and penetration testing for infrastructures, web and applications, using both manual and automated techniques. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Evaluate and apply tools and techniques to formulate countermeasures to secure information systems against security threats. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Perform security audits and forensic analysis to evaluate the effectiveness of a security system, and identify and correct security vulnerabilities. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Monitor and analyze logs and alerts from network devices to determine the extent of a security breach and what data has been compromised. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. Identify, collect, and log relevant data as evidence for a sample case within a business or in the Canadian Justice System. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL # OF OUTCOMES EVALUATED BY EACH COURSE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V = Vocational Courses E = Essential Employability Skills Courses | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GM = General Education (mandatory) G = General Education (elective) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NB - Only indicate the outcomes that are Taught & Evaluated (TE or TRE) in a course

PROGRAM COORDINATOR: Karen MacIntyre
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results:

| PROGRAM MAPPING (Name of Program) | LEVEL FIVE | | | | | | LEVEL SIX | | | | | | # OF COURSES EVALUATING THE OUTCOME | TOTAL FOR PROGRAM |
|---|--|---------------------------------------|------------------------------|---|-----------------------------|----------------------------|-------------------|-----------------------|---|---|--|---|-------------------------------------|-------------------|
| | INFO-5118 Perimeter Defense and Design | INFO-5119 Attack Vectors and Analysis | RTY-5007 Penetration Testing | SRTY-3012 Incidence Handling and Response | INFO-5117 Digital Forensics | INFO-5127 Network Security | GEED-XXXX General | GEED-XXXX General (G) | INFO-5116 Research Project & Entrepreneurship | SRTY-5004 Hacking Techniques and Exploits | SRTY-5005 Advanced Penetration Testing | SRTY-5006 Malware Analysis and Response | | |
| PROGRAM VOCATIONAL LEARNING OUTCOMES | | | | | | | | | | | | | | |
| 1 - Introductory | | | | | | | | | | | | | | |
| 2 - Intermediate | | | | | | | | | | | | | | |
| 3 - Advanced | | | | | | | | | | | | | | |
| The graduate has reliably demonstrated the ability to: (Source: MTCU Code) | | | | | | | | | | | | | | |
| 1. Configure, implement, manage and secure devices and equipment considering the unique features of the computer operating systems, networks, applications and software. | 3 | 3 | 3 | 3 | 3 | 3 | | | 2 | 3 | 3 | 3 | 3 | 30 |
| 2. Design, implement and evaluate security solutions for business processes, applications and communications to protect business resources and respond to the needs of all the internal stakeholders. | 3 | 3 | 3 | 3 | 3 | 3 | | | 3 | | 3 | | | 29 |
| 3. Use project management principles to implement security strategies and processes that address the organization's information security requirements. | | | | | | | | | 3 | | | | 3 | 7 |
| 4. Develop, implement and evaluate organizational security policies, standards and regulations to promote internal security. | 3 | 3 | 3 | 3 | 3 | 3 | | | 2 | | | | 3 | 30 |
| 5. Perform vulnerability assessments and penetration testing for infrastructures, web and applications, using both manual and automated techniques. | 3 | 3 | 3 | 3 | 3 | 3 | | | 2 | 3 | 3 | | | 15 |
| 6. Evaluate and apply tools and techniques to formulate countermeasures to secure information systems against security threats. | 3 | 3 | 3 | 3 | 3 | 3 | | | 3 | 3 | 3 | | | 30 |
| 7. Perform security audits and forensic analysis to evaluate the effectiveness of a security system, and identify and correct security vulnerabilities. | 3 | 3 | 3 | 3 | 3 | 3 | | | 3 | | | | | 12 |
| 8. Monitor and analyze logs and alerts from network devices to determine the extent of a security breach and what data has been compromised. | 3 | 3 | 3 | 3 | 2 | | | | 2 | | | 3 | | 19 |
| 9. Identify, collect, and log relevant data as evidence for a sample case within a business or in the Canadian Justice System. | | 2 | | | 2 | | | | 2 | 2 | | | | 13 |
| TOTAL # OF OUTCOMES EVALUATED BY EACH COURSE | 7 | 8 | 7 | 7 | 6 | 5 | 0 | | 9 | 4 | 3 | 1 | 5 | |
| V = Vocational Courses E = Essential Employability Skills Courses | | | | | | | | | | | | | | |
| GM = General Education (mandatory) G = General Education (elective) | | | | | | | | | | | | | | |

NB - Only indicate the outcomes that are Taught & Evaluated (TE or TRE) in a course

PROGRAM COORDINATOR: Karen MacIntyre
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results:

APPENDIX E – Program Outcomes – Curriculum Map

| PROGRAM MAPPING Cyber Security | | LEVEL ONE | | | | | | | | | | LEVEL TWO | | | | | | | # OF COURSES SUPPORTING THE OUTCOME |
|---|---|-----------------------------------|------------------------------------|---------------------------------|--|-----------------------|--|------------------------------|----------------------------|--------------------------|---|--------------------------|------------------------|------------------------------------|----|----|--|--|-------------------------------------|
| PROGRAM ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES | | INFO-1220 Networking Fundamentals | INFO-1221 Programming Fundamentals | INFO-1222 Database Fundamentals | INFO-1218 Operating Systems Fundamentals | PHIL-1019 Ethics (GM) | WRIT-1043 Reasoning & Writing for IT/WRIT-1034 Reasoning & Writing - EAP | INFO-1207 Network Components | INFO-1208 PHP Fundamentals | SRTY-1021 Cyber Security | INFO-1209 Cryptography and Authentication Systems | INFO-1210 Securing Linux | CRIM-1036 - Cybercrime | INFO-1212 Securing Windows Systems | | | | | |
| 4 = R | 5 = RE | 6 = TE | 7 = TRE | | | | | | | | | | | | | | | | |
| 1. | communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. | 4 | 6 | 5 | 4 | 6 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 4 | | 13 | | | |
| 2. | respond to written, spoken, or visual messages in a manner that ensures effective communication. | 5 | | | 5 | 6 | 6 | 4 | | 5 | 4 | 4 | 4 | 5 | | 10 | | | |
| 3. | execute mathematical operations accurately. | 4 | 6 | 5 | 7 | 7 | 7 | 7 | 6 | 7 | 4 | 4 | 4 | 7 | | 10 | | | |
| 4. | apply a systematic approach to solve problems. | 7 | 6 | 7 | 7 | 7 | 6 | 7 | 6 | 7 | 7 | 7 | 7 | 7 | | 11 | | | |
| 5. | use a variety of thinking skills to anticipate and solve problems. | 7 | 4 | 7 | 7 | | 6 | 7 | 4 | 7 | 5 | 7 | 7 | | 11 | | | | |
| 6. | locate, select, organize, and document information using appropriate technology and information systems. | 6 | 6 | 7 | 6 | 6 | 6 | 7 | 6 | | 6 | 7 | 7 | 6 | | 12 | | | |
| 7. | analyze, evaluate, and apply relevant information from a variety of sources. | 6 | 4 | 5 | 5 | 6 | 6 | 4 | 4 | | 6 | 5 | 6 | | 12 | | | | |
| 8. | show respect for the diverse opinions, values, belief systems, and contributions of others. | 5 | 4 | 5 | 4 | 7 | 4 | 4 | 4 | | 4 | 4 | 4 | | 12 | | | | |
| 9. | interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. | 4 | 4 | 5 | | | 4 | 4 | 4 | | 4 | 4 | 4 | | 10 | | | | |
| 10. | manage the use of time and other resources to complete projects. | 7 | 4 | 5 | 5 | | 4 | 7 | 4 | 5 | 6 | 5 | 6 | | 12 | | | | |
| 11. | take responsibility for one's own actions, decisions, and consequences. | 6 | 4 | 5 | 5 | 7 | 4 | 4 | 4 | | 4 | 5 | 4 | | 12 | | | | |
| TOTAL # OF OUTCOMES SUPPORTED BY EACH COURSE | | 11 | 10 | 10 | 10 | 6 | 10 | 11 | 10 | 4 | 11 | 11 | 11 | 10 | | | | | |

PROGRAM COORDINATOR: TBD
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results:

| PROGRAM MAPPING (Name of Program) | | LEVEL THREE | | | | | | | | | | LEVEL FOUR | | | | | | | |
|---|----------------|---|---|----------------------------------|---------------------------|---|----------------------------------|-------------------------------------|----------------------|--|------------------------------|---------------------------------|--|-------------------------------|--|---|-------------------------------------|--|--|
| PROGRAM ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES | | COMM-3047 Communication for IT Professionals | COOP-1020 Co-operative Education Employment Prep | SRTY-3008 Security Management | SRTY-3004 Web Security | SRTY-3007 Auditing and Security Controls | INFO-3005 Security Mechanisms | INFO-3128 Scripting for Security | INFO-3127 Network | INFO-3126 Wireless and Mobile Devices | SRTY-5008 Web Security II | INFO-3129 Network Monitoring | COMM-1127 Technical Writing and Presentations | CRIM-3001 Criminology (GM) | INFO-3131 Evolving Technologies and Threats | SRTY-3009 Computational Intelligence | # OF COURSES SUPPORTING THE OUTCOME | | |
| 4 = R | 5 = RE | 6 = TE | 7 = TRE | | | | | | | | | | | | | | | | |
| T = Taught | R = Reinforced | E = Evaluated | | | | | | | | | | | | | | | | | |
| <p>The graduate has reliably demonstrated the ability to: (Source: MTCU Code)</p> <p>1. communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>2. respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>3. execute mathematical operations accurately.</p> <p>4. apply a systematic approach to solve problems.</p> <p>5. use a variety of thinking skills to anticipate and solve problems.</p> <p>6. locate, select, organize, and document information using appropriate technology and information systems.</p> <p>7. analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>8. show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>9. interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.</p> <p>10. manage the use of time and other resources to complete projects.</p> <p>11. take responsibility for one's own actions, decisions, and consequences.</p> | | | | | | | | | | | | | | | | | | | |
| TOTAL # OF OUTCOMES SUPPORTED BY EACH COURSE | | 10 | 8 | 11 | 11 | 11 | 7 | 10 | # | 9 | 11 | 11 | 10 | 10 | 7 | 11 | | | |

PROGRAM COORDINATOR: Karen MacIntyre
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results:

| PROGRAM MAPPING (Name of Program) | | LEVEL FIVE | | | | | | LEVEL SIX | | | | | | # OF COURSES SUPPORTING THE OUTCOME | TOTAL FOR PROGRAM |
|--|----------------|--|---------------------------------------|------------------------------|--|-----------------------------|----------------------------|-------------------|-----------------------|---|---|--|---|---------------------------------------|-------------------|
| PROGRAM ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES | | INFO-5118 Perimeter Defense and Design | INFO-5119 Attack Vectors and Analysis | RTY-5007 Penetration Testing | SRTY-3012 Incident Handling and Response | INFO-5117 Digital Forensics | INFO-5127 Network Security | GEED-XXXX General | GEED-XXXX General (G) | INFO-5116 Research Project & Entrepreneurship | SRTY-5004 Hacking Techniques and Exploits | SRTY-5005 Advanced Penetration Testing | SRTY-5006 Malware Analysis and Response | INFO-5120 Secure Network Architecture | |
| 4 = R | 5 = RE | 6 = TE | 7 = TRE | | | | | | | | | | | | |
| T = Taught | R = Reinforced | E = Evaluated | | | | | | | | | | | | | |
| The graduate has reliably demonstrated the ability to: (Source: MTCU Code) | | | | | | | | | | | | | | | |
| 1. communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. | | 4 | 4 | 4 | 4 | 4 | 4 | | 6 | 4 | 4 | 4 | 4 | 4 | 11 |
| 2. respond to written, spoken, or visual messages in a manner that ensures effective communication. | | 5 | 5 | 5 | 5 | 4 | 5 | | 6 | 5 | 5 | 5 | 5 | 5 | 11 |
| 3. execute mathematical operations accurately. | | 4 | 4 | 4 | 4 | | 4 | | 4 | 4 | 4 | 4 | 4 | 10 | 29 |
| 4. apply a systematic approach to solve problems. | | 7 | 7 | 7 | 7 | | 7 | | 7 | 7 | 7 | 7 | 7 | 7 | 11 |
| 5. use a variety of thinking skills to anticipate and solve problems. | | 7 | 7 | 7 | 7 | 6 | 7 | | 7 | 7 | 7 | 7 | 7 | 7 | 11 |
| 6. locate, select, organize, and document information using appropriate technology and information systems. | | 6 | 6 | 6 | 6 | 7 | 6 | | 7 | 6 | 6 | 6 | 6 | 6 | 11 |
| 7. analyze, evaluate, and apply relevant information from a variety of sources. | | 6 | 6 | 6 | 6 | 7 | 5 | | 7 | 6 | 6 | 6 | 6 | 6 | 11 |
| 8. show respect for the diverse opinions, values, belief systems, and contributions of others. | | 5 | 5 | 5 | 5 | 4 | 4 | | 4 | 5 | 5 | 5 | 5 | 5 | 11 |
| 9. interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. | | 4 | 4 | 4 | 4 | 4 | | | 4 | 4 | 4 | 4 | 4 | 4 | 10 |
| 10. manage the use of time and other resources to complete projects. | | 7 | 7 | 7 | 7 | 4 | 5 | | 6 | 7 | 7 | 7 | 7 | 7 | 11 |
| 11. take responsibility for one's own actions, decisions, and consequences. | | 6 | 6 | 6 | 6 | 4 | 5 | | 4 | 6 | 6 | 6 | 6 | 6 | 11 |
| TOTAL # OF OUTCOMES SUPPORTED BY EACH COURSE | | 11 | 11 | 11 | 11 | 10 | 10 | 0 | 11 | 11 | 11 | 11 | 11 | 11 | |

PROGRAM COORDINATOR: Karen MacIntyre
 ACADEMIC CHAIR: Jim Edwards
 Date Completed: October 2015

Analysis of Mapping Results: