***NEW COURSE PROPOSAL***

*Spring 2021*

“**Data Security, Privacy and Ethics"**

Respectfullysubmitted to College Council Curriculum Committee *by:*

Prof. Yu-Wen Chen, Computer Systems Technology Department

**TABLE OF CONTENTS**

**Curriculum Modification Proposal Form 2**

**New Course Proposal Form 4**

**New Course Proposal Check List 6**

**Library Resources Form 9**

**Course Outline 11**

**Course Need Assessment 16**

**Course Design 16**

**Chancellor's Report Form 17**

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| **Brief Description of Proposal**  (Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body.) | databases. The data analytics skills and how the analytical skills can be used effectively against the new threat in the information security will also be covered in this course. |
| **Brief Rationale for Proposal**  (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body). | The proposed new course (Data Security, Privacy and Ethics) in this proposal is the first security course for students in the Bachelor of Science in Data Science. It is necessary and important for Data Science students to acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. This course will address the privacy, legal and ethics concerns that arise with big data and recognize the role security management plays in cyber security and data security defense. It is also beneficial to introduce students how to utilize and apply the data analytic skills in the cyber security field. |
| **Proposal History**  (Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | This is a new proposal. |

**New York City College of Technology, CUNY**

**NEW COURSE PROPOSAL FORM**

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | *New Course:* Data Security, Privacy and Ethics |
| **Proposal Date** | Feb. 10, 2020 |
| **Proposers' Names** | Prof. Yu-Wen Chen, Computer Systems Technology |
| **Course Number** | CST 2412 |
| **Course Credits, Hours** | 3 credits; 2 lecture hours and 2 lab hours |
| **Course Pre-requisites** | CST 2402 |
| **Catalog Course Description** | This course is an introduction to security issues facing computer professionals and data scientists today. Students will acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. Students will understand the privacy, legal and ethics concerns that arise with big data and recognize the role security management plays in cyber security and data security defense. It introduces the fundamental concepts of authentication, access model, and cryptography. It also focusses on the data-related security issues from the web, network, cloud computing and databases. The data analytics skills and how the analytical skills can be used effectively against the new threat in the information security will also be covered in this course. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Data Security, Privacy and Ethics is the first security course for students in the Bachelor of Science in Data Science. It is necessary and important for Data Science students to acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. This course equips students and computing professionals with the basic information and data security knowledge and how to utilize data analytics to implement and maintain modern information infrastructure and systems. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | No equivalents within CUNY, to our knowledge. Related, but not duplicative, courses at CUNY-Queensborough Community College is CIS-254 (Data Security for Business).  Related, but not duplicative, courses offered in other institutions around the country: at University of Pennsylvania is LGST642x (Big Data, Big Responsibilities: The Law and Ethics of Business Analytics); at Brandeis University in Massachusetts is RSAN177 (Data Security, Privacy, and Ethics). Possibly other institutions around the country. |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | Not applicable. |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | Pending outcome of this proposal. |
|  |
| No. |
| **Intent to Submit as a Writing Intensive Course** | No. |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** |  |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | X |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. | **X** |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. | X |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | X |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. | X |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | X |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) | N/A |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee | N/A |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) | N/A |
| Writing Intensive Form if course is intended to be a WIC (under development) | N/A |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. | N/A |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** |  |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**LIBRARY RESOURCES & INFORMATION LITERACY: MAJOR CURRICULUM MODIFICATION**

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new courses/programs.

Consult with your library faculty subject specialist (<http://cityte.ch/dir>) **3 weeks before the proposal deadline**.

**Course proposer:** please complete boxes 1-4. **Library faculty subject specialist:** please complete box 5.

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| **1** | **Title of proposal**  CST 2412 – Data Security, Privacy and Ethics | **Department/Program**  Computer Systems Technology / BS in Data Science |
|  | **Proposed by** (include email & phone)  Dr. Yu-Wen Chen  [YWChen@citytech.cuny.edu](mailto:YWChen@citytech.cuny.edu)  718-260-5325 | **Expected date course(s) will be offered**  Spring 2021  **# of students:** 24 |

|  |  |
| --- | --- |
| **2** | **The library cannot purchase reserve textbooks for every course at the college, nor copies for all students. Consult our website (**[**http://cityte.ch/curriculum**](http://cityte.ch/curriculum)**) for articles and ebooks for your courses, or our open educational resources (OER) guide (**[**http://cityte.ch/oer**](http://cityte.ch/oer)**). Have you considered using a freely-available OER or an open textbook in this course?**  No, I have not considered freely available OER or an open textbook for this course. |

|  |  |
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| **3** | **Beyond the required course materials, are City Tech library resources sufficient for course assignments? If additional resources are needed, please provide format details (e.g. ebook, journal, DVD, etc.), full citation (author, title, publisher, edition, date), price, and product link.**  Yes, City Tech Library resources are sufficient for the proposed course assignments because the main readings for the course are a required textbook and journal articles that will be assigned by instructor. Students should be able to locate the selected journal articles in library. |

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| **4** | **Library faculty focus on strengthening students' information literacy skills in finding, critically evaluating, and ethically using information. We collaborate on developing assignments and customized instruction and research guides. When this course is offered, how do you plan to consult with the library faculty subject specialist for your area? Please elaborate.**  I will reach out to the library subject specialist via email to arrange an information session in which the library subject specialist can present to the students of this course, the use of library databases, citation convention and discuss copyright issues. |

|  |  |
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| **5** | **Library Faculty Subject Specialist Prof. Junior Tidal**  **Comments and Recommendations**  After surveying the collection, I believe that the library can adequately support this course. Upon course approval, I recommend that the library acquires print monographs related to cyber security and machine learning. It may also be beneficial to students to have access to films and specific journals as well.  **Date: 02.13.2020** |

**Course Outline**

# **New York City College of Technology/CUNY**

**Computer Systems Technology Department**

**CST 2412 – Data Security, Privacy and Ethics (2 Lecture hours, 2 lab hours, 3 credits)**

# **Course Description:** This course is an introduction to security issues facing computer professionals and data scientists today. Students will acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. Students will understand the privacy, legal and ethics concerns that arise with big data and recognize the role security management plays in cyber security and data security defense. It introduces the fundamental concepts of authentication, access model, and cryptography. It also focusses on the data-related security issues from the web, network, cloud computing and databases. The data analytics skills and how the analytical skills can be used effectively against the new threat in the information security will also be covered in this course.

**Objective:** This is the first security course in the data science program. It equips students and computing professionals with the basic information and data security knowledge and how to utilize data analytics to implement and maintain modern information infrastructure and systems.

**Learning Outcomes:**

At the end of the course, students should be able to:

* Demonstrate knowledge of the broad set of technical, social & political aspects of information security and data security
* Demonstrate an understanding of how to maintain and protect the coherence, authenticity, availability of the data
* Demonstrate an understanding of the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure
* Demonstrate an understanding of the risks and vulnerabilities associated with information and data.
* Demonstrate an understanding of the nature of secure the data base design and from the web user side
* Demonstrate an understanding of the role security management plays in information security and data security defense
* Demonstrate knowledge of the legal, ethical and social issues at play in developing solutions
* Demonstrate the ability of protecting privacy by using cryptography and applying data analytics for security

**General Education Outcomes:**

* **SKILLS/Inquiry/Analysis:** Students use scientific reasoning and logical thinking.
* **SKILLS/Communication:** Students use written (both reading and writing), oral (both speaking and listening), and visual means to communicate.
* **VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development:** Students work in diverse teams utilizing key traits including respect, cooperation and creativity.

**Prerequisites**: CST2402

**Required textbook**: Pfleeger, C.P., Security in Computing 5th Edition, Prentice Hall, Copyright 2010ISBN 0-13-239077-9

**Homework/Labs Assignments:** Homework/Labs assignments will be based on chapter questions and other selected practices.

# **Group Project:** The group project requires student to conduct a thoughtful study on the specific course related topic (selected by students and need to be approved by the instructor). Students have to present in class with the power point slides for 15 minutes and submit a formal project report at the end of the semester.

**On-line Certificate:**

Students are required to complete the certificate “AWR173 Information Security Basics” offered by the TEEX.

The URL for registering the on-line certificate:

<https://teex.org/Pages/Program.aspx?catID=607&courseTitle=Cybersecurity>

**Grade Requirement:**

Students must complete all project assignments, homework assignments, participate in all tests.

**Course grading formula:**

Assignments 15%

Group project 20%

Quizzes & Participation 10%

On-line Certificate 15%

Midterm Exam 20%

Final Exam 20%

100%

All assignments and on-line certificate should be submitted to the blackboard. Emailing them to me is not accepted.

**Grading Policy:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Letter Grade** | **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **D** | **F** |
| **Numeric Grade** | **93-100** | **90-92.9** | **87-89.9** | **83-86.9** | **80-82.9** | **77-79.9** | **70-76.9** | **60-69.9** | **59 and below** |

**Academic Integrity Standards:**

The instructor of the course has the authority to give a grade of **F** if the student submits the work of another person in a manner that represents his/her work, or knowingly permits one’s work to be submitted by another person without the instructor’s permission (see College Catalog).

**Progression Requirements**

Students majoring in CST must earn a grade of “C” or better in this course.

**Topics and Schedule:**

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| --- | --- | --- |
| **Week** | **Topics** | **Readings** |
| **1** | Introduction to information Security | Chapter 1 |
| **2 - 3** | Authentication, Access Control, and Cryptography | Chapter 2 |
| **4** | The Web – user side | Chapter 4 |
| **5** | Background for the Network and Network security | Chapter 6 |
| **6** | Security in the Databases, Cloud computing and Big Data | Chapter 7, Chapter 8 and selected reading |
| **7** | Review & Midterm |  |
| **8** | Privacy | Chapter 9 and selected reading |
| **9** | Legal issues and Ethics | Chapter 11 |
| **10** | Management and Incidents | Chapter 10 |
| **11 - 12** | Data Analytic for Security | Selected reading |
| **13 - 14** | Data Poisoning and Model Evasion | Selected reading |
| **15** | Review & Final Exam |  |

**Intended learning outcomes:** what students will know or be able to do at the end of this course:

|  |  |
| --- | --- |
| **Course-specific outcomes** | **Assessment methods**  *(described below)* |
| * Demonstrate knowledge of the broad set of technical, social & political aspects of information security and data security. * Demonstrate an understanding of how to maintain and protect the coherence, authenticity, availability of the data. | * Quizzes * Assignments * Certificate * Participation * Project * Exams |
| * Demonstrate an understanding of the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure. * Demonstrate an understanding of the risks and * vulnerabilities associated with information and data. | * Quizzes * Assignments * Certificate * Participation * Exams |
| * Demonstrate an understanding of the nature of secure the data base design and from the web user side. * Demonstrate an understanding of the role security management plays in information security and data security defense. | * Quizzes * Assignments * Participation * Exams |
| * Demonstrate knowledge of the legal, ethical and social issues at play in developing solutions. | * Quizzes * Assignments * Participation * Exams |
| * Demonstrate the ability of protecting privacy by using cryptography and applying data analytics for security. | * Quizzes * Project * Assignments * Certificate * Participation * Exams |

**General Education Learning Outcomes / Assessment Methods**



|  |  |
| --- | --- |
| **Learning Outcomes** | **Assessment Methods** |
| 1. Demonstrate the ability to work collaboratively and independently on assignments in and outside a classroom setting. | * Classroom discussions, * Assignments * Project oral presentations. |
| 1. Understand and employ both quantitative and qualitative analysis to solve problems. | * Classroom discussion * Group in-class activities * Group project presentations * Quizzes   Exams |
| 1. Develop reading, writing competencies, and listening skills. | * Writing assignments (Each assignment requires writing) * Project report * Classroom discussion. |
| 1. Work with teams. Build consensus. Use creativity. | * Group projects and presentations. |

**Reference books and sites:**

1. Mayer-Schonberger and Cukier 2013 Big Data: A Revolution that Will Transform - How We Live, Work, and Think
2. Tom Mitchell, Machine Learning, McGraw-Hill, 1997
3. Wenke Lee and Sal Stolfo. [A Framework for Constructing Features and Models for Intrusion Detection Systems](http://wenke.gtisc.gatech.edu/papers/ids_framework.ps) Wenke Lee and Sal Stolfo. ACM Transactions on Information and System Security, 3(4), November 2000.
4. Ke Wang and Sal Stolfo. Anomalous Payload-based Network Intrusion Detection. In Proceedings of International Symposium on Recent Advances in Intrusion Detection, 2005. <https://pdfs.semanticscholar.org/c441/1d48c00924f7ebc57d4e7ebaa8d2f23c973e.pdf>
5. Prahlad Fogla, Monirul Sharif, Roberto Perdisci, Oleg Kolesnikov, and Wenke Lee. Polymorphic Blending Attacks. In Proceedings of the USENIX Security Symposium, 2006. <https://www.usenix.org/legacy/event/sec06/tech/full_papers/fogla/fogla_html/main.html>
6. Roberto Perdisci, David Dagon, Wenke Lee, Prahlad Fogla, and Monirul Sharif. Misleading Worm Signature Generators Using Deliberate Noise Injection. In Proceedings of the IEEE Symposium on Security and Privacy, 2006. <http://www.cc.gatech.edu/home/wenke/papers/ieee-sp-06.pdf>

**Course Need**

**Students who would take this class:** students who intend to major in Data Science

**Department**: Computer Systems Technology

**Program**: Bachelors in Data Science

**The number of section (s) anticipated:** one section for the first year

**Projected headcount: 24** students

**Physical Resources required:** Basicsmartroomset**-**up**:** a screen, and an overhead projector/a TV set that is run by and connected to a computer

**Course overlap:** None

**Faculty** **qualified** **for** **teaching** **this** **course**: Yes, there are faculty members who have doctoral degrees in Computer Science with the concentration in Information Security and Data Analytic for various domains.

**Course Design**

**Course context:** This course will be required of Data Science major students. Students are required to develop an independent project at the end of the semester.

**Course** **structure**: This course will be offered in a lecture style/format.

**Anticipated** **Pedagogical** **Strategies** **and** **Instructional** **Design**: This class will be run in a lecture-activity style/format. The class will start with a lecture, and involve the in-class activities, such as group discussion, hands-on exercises (examples: calculating the risk and determining the preferred defense strategies) and hands-on labs (examples: cryptography tools).

**Providing Support to Programmatic Learning Outcomes:** This course requires satisfactory completion of individual assignments, quizzes, on-line certificate, exams and the final group project.

**Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program.** Not online; all in-person.

**CHANCELLOR'S REPORT FORM**

***NEW COURSE PROPOSAL:* "Data Security, Privacy and Ethics"**

|  |  |
| --- | --- |
| **Department(s)** | Computer Systems Technology |
| **Academic Level** | **[ X ] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Data Science |
| **Course Prefix** | CST |
| **Course No.** | CST 2412 |
| **Course Title** | Data Security, Privacy and Ethics |
| **Catalog Description** | This course is an introduction to security issues facing computer professionals and data scientists today. Students will acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. Students will understand the privacy, legal and ethics concerns that arise with big data and recognize the role security management plays in cyber security and data security defense. It introduces the fundamental concepts of authentication, access model, and cryptography. It also focusses on the data-related security issues from the web, network, cloud computing and databases. The data analytics skills and how the analytical skills can be used effectively against the new threat in the information security will also be covered in this course. |
| **Prerequisites** | CST 2402 |
| **Credits** | 3 |
| **Contact Hours** | 4 (2 lecture and 2 lab hours) |
| **Liberal Arts** | **[ X ] Yes** [ ] No |
| **Course Attribute** | **It is not a writing intensive course** |
| **Course Applicability** | **[X] Major**  **[ ] Gen Ed Required [ ] Gen Ed - Flexible [ ] Gen Ed - College Option**  **[ ] English Composition [ ] World Cultures [ ] Speech**  **[ ] Mathematics [ ] US Experience in its Diversity**  **[ ] Interdisciplinary [ ] Science [ ] Creative Expression**  **[ ] Advanced Liberal Arts**  **[ ] Individual and Society**  **[ ] Scientific World** |
| **Effective Term** | **Spring 2021** |

**Rationale:**

The proposed new course (Data Security, Privacy and Ethics) is the first security course for students in the Bachelor of Science in Data Science. It is necessary and important for Data Science students to acquire the knowledge and skills on how to maintain the coherence, authenticity, and availability of data. This course will address the privacy, legal and ethics concerns that arise with big data and recognize the role security management plays in cyber security and data security defense. It is also beneficial to introduce students how to utilize and apply the data analytic skills in the cyber security field.