Assessment Plan (Draft)
B.S. in Cybersecurity

School of Information Technology
Illinois State University

Program Educational Objectives:

The program educational objectives (PEO) of the cybersecurity program are as follows:

1. Be a successful practitioner in cybersecurity-related field or accepted into a graduate program
2. Engage in professional development through continuing education, certifications, professional organizations, or experience
3. Be characterized by effective leadership skills and high standards of ethics.
4. Live and work as contributing, well-rounded members of society

Student Outcomes:

At the time of graduation, a student in our information systems program must attain the following outcomes:

a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
b. An ability to analyze a cybersecurity problem, and identify and define the technical and procedural requirements appropriate to its solution
c. An ability to design, implement, and evaluate a cybersecurity system's compliance with various industry or governmental standards
d. An ability to function effectively on teams to accomplish a common goal
e. An understanding of professional, ethical, legal, security and social issues and responsibilities
f. An ability to communicate effectively verbally and in writing
g. Recognition of the need for and an ability to engage in continuing professional development
h. An ability to apply current techniques, skills, and tools necessary for cybersecurity practice

Relationship of Student Outcomes to Program Educational Objectives

The table below summarizes the relationship between student outcomes and program educational objectives:

Student Outcomes	Program Educational Objectives		
	1.Be successfully employed in an Information Systems related field or accepted into a graduate program	2.Engage in professional development through continuing education, certifications, professional organizations, or experience	3.Live and work as contributing, well-rounded members of society
(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.	▪	▪	
(b) An ability to analyze a cybersecurity problem, and identify and define the technical and procedural requirements appropriate to its solution	▪	▪	
(c) An ability to design, implement, and evaluate a cybersecurity system's compliance with relevant industry or governmental standards	▪	▪	
(d) An ability to function effectively on teams to accomplish a common goal	▪		▪
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities	▪		▪
(f) An ability to communicate effectively verbally and in writing	▪		▪
(g) Recognition of the need for and an ability to engage in continuing professional development	▪	▪	▪
(h) An ability to apply current techniques, skills, and tools necessary for cybersecurity practice	▪	▪	

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Write a computer program that solves a business problem	IT 168, IT 178, IT 378	IT 178	Use rubric (a) (i)	IT 178: Completed program that solves a business problem	IT 178 students	60%	Odd Fall Semesters
Write queries to retrieve data from databases	IT 378	IT 378	Use rubric (a) (ii)	IT 378: Assignments from later in semester with queries, or exam questions	IT 378 students	80%	Odd Fall Semesters
Perform a cost-benefit analysis	IT 262, IT 363, IT 378	IT 262	Use rubric (a) (iii)	IT 262: Assignment(s) that involve creation of cost-benefit analysis	IT 262 students	60%	Odd Fall Semesters

* - The expected level of attainment is measured by the minimum percentage of the assessed sample that is scored in the two maximum (Developed/Exemplary) categories of the relevant rubric.

Outcome (a): An ability to apply knowledge of computing and mathematics appropriate to the discipline				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Write a computer program that solves a business problem	Program has major syntactical errors or does not run with normal inputs without crashing, code does not solve the given problem	Program produces correct results in only some cases, program crashes with some valid inputs	Program works correctly for all sample data and typical cases, solves the correct problem	Program works correctly for all relevant cases, and addresses at least one unspecified case or implements an extra feature
(ii) Write queries to retrieve data from databases	Does not know the query syntax	Writes queries to create, use, and modify tables, records, and attributes. Queries may not always work correctly	Writes and successfully executes variety of queries including join queries, can create variety of reports, uses grouping	Writes parameter queries, stored procedures, and triggers
(iii) Perform a cost-benefit analysis	Does not recognize any of the CBA methods	Successfully uses a CBA method	Successfully uses more than one CBA method	Can choose the most appropriate CBA method for a specific scenario and successfully apply it

(b) An ability to analyze a cybersecurity problem, and identify and define the technical and procedural requirements appropriate to its solution							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Uses established cybersecurity models to analyze a problem	IT 250, IT 351, IT 357, IT 360	IT 360	Use rubric (b)(i)	IT 360: Assignment that requires using models for problem analysis	IT 360 students	50%	Even Fall Semesters
Identifies technical and procedural requirements to solve a problem	IT 250, IT 351, IT 357, IT 360	IT 360	Use rubric (b)(ii)	IT 360: Assignment that requires both technical and procedural solutions	IT 360 students	50%	Even Fall Semesters

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Rubric (b): An ability to analyze a cybersecurity problem, and identify and define the technical and procedural requirements appropriate to its solution				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Uses established cybersecurity models to analyze a problem	Under Revision			
(ii) Identifies technical and procedural requirements to solve a problem	Records none or very few requirements	Record some appropriate requirements but misses one or more major requirements	Records all appropriate requirements	Records all appropriate requirements in a well-formatted and logical manner

(c) An ability to design, implement, and evaluate a cybersecurity system's compliance with relevant industry or governmental standards							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Uses common modeling techniques to design a solution	IT 261, IT 363, IT 378,	IT 261	Use rubric (c) (i)	IT 261: Assignment(s) that deal with using models to design a solution to a given problem	IT 261 students	50%	Even Fall semesters
Under Revision							
Evaluates alternative solutions	IT 262, IT 378	IT 262, Exit Exam	Use rubric (c) (iv)	IT 262: Homework or paper that deals with proposing or evaluating multiple solutions to the same problem Exit Exam: Question(s) relating to evaluating alternative solutions to a given problem	IT 262 students Students taking exit exam	60% (IT 262) 70% (Exit exam)	IT 262: Even fall semesters Exit exam: Even fall semesters, Odd Fall semesters

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Outcome (c): An ability to design, implement, and evaluate a cybersecurity system's compliance with various industry or governmental standards				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Use common modeling techniques to design a solution	Unable to create a recognizable model	Create models but models do not fully represent the problem domain or are not consistent with the specified modeling language	Create models that represent the problem domain and are consistent with the specified modeling language	Creates a well-formed and parsimonious design model that can be used by an external coder for developing a computer application
(ii) Under Revision				
(iii) Evaluates alternative solutions	Student does not correctly identify at least two correct solutions for the given problem, does not use correct methods to evaluate them	Student identifies correct alternatives but evaluates them incorrectly	Student identifies correct alternatives, uses correct evaluation methods and reaches correct conclusions	Student goes beyond requirements, presents detailed and correct evaluation of each alternative solution

(d) An ability to function effectively on teams to accomplish a common goal							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Participates in team activities	IT 250, IT 276, IT 351, IT 378, IT 391, Internship survey	IT 351	Use rubric (d)	IT 351: Peer and group reviews from group assignment(s) or projects	IT 351 students	80%	Odd Fall semesters
Completes team assignments on time							
Leads team activities							

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Outcome (d): An ability to function effectively on teams to accomplish a common goal				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Participates in team activities	Does not contribute to discussions, does not let others express opinions	Contributes occasionally to team activities	Contributes equally in team activities	Contributes a higher share to team activities without taking over the team
(ii) Completes team assignments on time	Does not contribute to final deliverable	Completes assigned tasks only partially	Satisfactorily completes assigned parts	Completes assigned parts and helps other team members with their assigned work, initiates and participates in team meetings
(iii) Leads team activities	Does not know what any other team member is doing	Knows only what some team members are doing, and not others	Describes clearly the role and responsibility of each team member	Motivates others to fulfill their responsibilities

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Identify security considerations for IT systems	IT 250, IT 351, IT 357, IT 378	IT 250	Use rubric (e)(i)	Question(s) relevant to identifying security considerations for IT systems	IT 250	70%	Under Revision
Identify laws that affect the IT industry	IT 250, IT 276	IT 250	Use rubric (e)(ii)	Question(s) relevant to identifying whether existing software programs can be used in a specific setting based on their licenses	IT 250	70%	
List elements from a professional code of ethics	IT 191, IT 359	IT 359	Use rubric (e) (iii)	Question(s) that relate sections of a professional code of ethics to a given situation	IT 359	70%	
Recognize social impact of cybersecurity measures	IT 191, IT 250, IT 351	IT 351	Use rubric (e) (iii)	Question(s) relevant to recognizing social impacts of cybersecurity measures	IT 351	70%	

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Outcome (e): An understanding of professional, ethical, legal, security and social issues and responsibilities				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Identify security considerations for IT systems	Can't identify security considerations	Identifies a few security considerations	Identifies security considerations appropriate for system	Identifies security considerations appropriate for system. Ranks considerations by risk level and provides reasoning for ranking.
(ii) Identify laws that affect the IT industry	Can't identify any laws that affect the IT industry	Identifies a few laws that affect the IT industry	Identifies laws that affect the IT industry	Identifies laws that affect the industry and can identify laws that will affect a system
(iii) List elements from a professional code of ethics	Can't list any elements from a professional code of ethics	Lists some but less than 70% of the elements from a professional code of ethics	Lists 70% or more of elements from a professional code of ethics	Lists all elements from a code of ethics
(iv) Recognize social impact of IT	Unable to articulate any social impact of IT	Recognizes some social impacts of IT	Recognizes social impacts of IT	Gives reasons for social impacts of IT

(f) An ability to communicate effectively verbally and in writing							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Communicates effectively verbally	IT 191, IT 261, IT 250, IT 276, IT 377, IT 378, COM 223	IT 351	Use rubric (f)(i)	IT 351: Oral Presentation	IT 351 students	70%	Odd Spring semesters
Communicates effectively in writing	IT 191, IT 262, IT 377, IT 360, IT 378, IT 391, ENG 249, ENG 223	IT 360	Use rubric (f)(ii)	IT 360: Written paper	IT 360 students	70%	Odd Spring semesters

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Rubric (f)(i)				
	Poor or Non-Existent	Developing	Developed	Exemplary
Clarity	Not assertive or clear overall	Assertive but inconsistent, occasionally trying to sound too technical or intentionally vague	Mostly clear and easy to understand	Clear and assertive, very easy to understand
Organization	Not well organized, no logical flow	Inconsistent flow, lacking macro or micro organization	Logically organized at micro and macro level	Entire communication has logical flow, flow is reinforced throughout
Audience	Not aimed at the intended audience	Reflects own knowledge rather than targeting audience, could have taken more efforts to direct talk at audience	Directed at appropriate audience	Targeting audience well enough to enhance communication
Engaging the audience	Not captivating, could not engage audience, little to no interaction with audience	Good beginning and end but not as engaging in between, not enough interaction with audience	Keeps the audience interested and facilitates some interaction	Keeps the audience awake and involved, occasionally adapting to audience's feedback
Delivery	Two or more of: Spoke too fast/too slow, did not address intended questions, inappropriate attire, took significantly longer or shorter than allotted time	One of: Spoke too fast/too slow, too many pauses, awkward body language	Spoke at appropriate pace, comfortable and appropriate body language	Calm. Clear diction. Good tone. Good pacing. Appropriate attire and personal grooming.

Rubric (f)(ii)				
Written Communication				
	Poor or Non-Existent	Developing	Developed	Exemplary
Clarity/ Precision	Too vague or too detailed, significant amount of information may be inaccurate.	Detailed but losing overall picture, or clear at a high level but missing details, attention to length rather than substance. Some information may be inaccurate.	Appropriately detailed and focused at a higher level. Writing is precise and concise.	Completely clear and precise
Organization	Not well-organized, no consistent flow	Micro-structure well defined but lacking macro-structure, or vice versa	Good and appropriate organization	Logically organized
Audience	Not catered to intended audience (wrong assumptions about audience, trying to target all types of audiences)	Not consistently aimed at the audience, occasionally too detailed or too vague	Mostly aimed at the appropriate audience	Aimed exactly at the appropriate audience
Mechanics and Style	Many spelling and grammar errors, no logical flow or document structure	Logical flow but with many spelling and grammar errors, or vice versa, crude document structure	No spelling or grammar errors. Reasonably good logical flow and appropriate document structure	No spelling or grammar errors. Good use of language and good logical flow
Visual aids	No visual aids/too many visual aids. Very poor visual aids.	Few visual aids, some incompletely made, not referred in the text. Some visual aids poorly designed	Appropriate number and kind of visual aids referred by the text at the proper places parts	Appropriate number of well-chosen visual aids that enhance communication

(g) Recognition of the need for and an ability to engage in continuing professional development							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Participates in independent learning	IT 250, IT 351, IT 357, IT 359, IT 360	IT 351	Use rubric (h)(i)	IT 351: Writes paper or presents on a security tool not discussed in class	IT 351	70% of total points available for presentation/paper	Even Spring semesters
Participates in ISUSec student club	IT student club	-	Count of membership	Membership of ISUSec student club	Cybersecurity and other students		Fall semesters
Learns and uses technology not taught in class	Independent studies, club projects, competitions, projects in IT 250, IT 351, 357, IT 359, IT 360, IT 391 Collegiate Cyberdefense and capture the flag events	-	Count of participants	Count of participants	All cybersecurity students	20% of all cybersecurity majors participating in one or more of these activities.	Even Fall semesters

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Rubric (h)(i)				
	Poor or non-existent	Developing	Developed	Exemplary
(i) Participates in independent learning	Little or no independent learning evident in work product	Meets assignment requirements only in terms of independent learning	Shows evidence of independent learning such as gathering at least one additional external source beyond that provided or assigned, synthesizes from existing information	Collects a great deal of information- all relates to the topic; went beyond assignment requirements; applied the synthesized knowledge to real-world problems.
(ii) Participates in ISUSec student club	Under Revision			
(iii) Learns and uses technology not taught in class	Learns and uses technology not taught in class			

(h) An ability to apply current techniques, skills, and tools necessary for cybersecurity practice .							
Performance Indicator	**Delivery Methods**	**Courses used for Assessment**	**Assessment Methods**	**Data Needed**	**Assessed Groups**	**Expected level of attainment***	**Timeline**
Complete hands-on lab exercises, and draw conclusions from the results	IT 250, IT 351, IT 357, IT 359, IT 360	IT 359	Use rubric (i)(i)	Completed lab exercises that require drawing conclusions from observations	IT 359	70%	Even Spring semesters
Design security requirements for a system based on industry standards	IT 250, IT 351, IT 357, IT 360	IT 357	Use rubric (i)(ii)	Assignment that requires design based on industry or gov't standard.	IT 357	60%	Even Spring semesters

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Outcome (i): An ability to use current techniques, skills, and tools necessary for computing practice				
	Poor or Non-Existent	Developing	Developed	Exemplary
(i) Complete hands-on lab exercises, and draw conclusions from the results	Under Revision			
(ii) Design security requirements for a system based on industry standards	Under Revision			

2-year assessment cycle (Quick Review for Implementation) *				
Semester	Course to be Assessed	What is assessed	Expected level of attainment	Complete Assessment By
Even Fall	Exit Exam (results from previous academic year)	c(iv), e(i), e(ii), e(iii) e(iv), g(i), g(ii)	70%	Week 8 of Odd Spring semester
	Internship Survey (from summer just before)	j(i), j(ii)	80%	Week 8 of Odd Spring semester
	Attendance at largest IT student club event	h(ii)	50% of all IS students	Week 8 of Odd Spring semester
	IT 261	b(i), b(ii), c(i)	50%	Week 5 of Odd Fall semester
Odd Spring	IT 261	i(iii)	50%	Week 5 of Odd Fall semester
	IT 363	j(i), j(ii), f(i), f(ii)	70%	Week 5 of Odd Fall semester
	Count of independent projects	h(iii)	20% of all students	Week 5 of Odd Fall semester
Odd Fall	IT 262	a(iii), c(iv)	60%	Week 5 of Even Spring semester
	IT 178	a(i), c(ii)	60%	Week 8 of Even Spring semester
	IT 378	a(ii), d	80%	Week 8 of Even Spring semester
	Exit Exam (results from previous academic year)	c(iv), e(i), e(ii), e(iii) e(iv), g(i), g(ii)	70%	Week 8 of Even Spring semester
	Internship Survey (from summer just before)	j(i), j(ii)	80%	Week 8 of Even Spring semester
	Attendance at largest IT student club event	h(ii)	50% of all IS students	Week 8 of Odd Fall semester
Even Spring	IT 378	h(i), i(i)	70%	Week 5 of Even Fall semester
	IT 178	i(ii)	60%	Week 5 of Even Fall semester

* Will be updated once rubrics and other parts are finished

Review of Program Educational Objectives	
When	Procedure
Odd spring semesters	1. Assessment committee reviews and makes suggestions if any. 2. Updates are presented and discussed in faculty meeting in April of the year. 3. Approved PEOs are presented to BIAC in October meeting of the year. 4. Approved PEOs are made available to other stakeholders such as selected student groups for feedback.

Review of Student Outcomes	
When	Procedure
Odd spring semesters	1. Assessment committee reviews and makes suggestions if any. 2. Assessment committee sends report to curriculum committee and Director by end of March of the year. 3. At Director's discretion, the updated student outcomes are tabled in faculty meeting. 4. Updated student outcomes are made available to other stakeholders such as selected student groups for feedback.