Reedley College
Cyber Security Support
Certificate of Achievement

NARRATIVE

Item 1. Program Goals and Objectives

The following goals are intended for both transfer, and/or occupational skills:
1. Design a network topology for a medium to large enterprise, while reading and understanding the fundamental goal of Cyber Security – Confidentiality, Integrity, and Availability (CIA) of data which is transmitted on a given network and governed by federal and state regulations, and procedures.
2. Design a network security system which is configured to protect a given network, while reading, researching and considering all elements of Cyber Security such as Physical, Communication, and Network security.
3. Design and configure an Intrusion Detection System (IDS), for a typical network for a medium to large enterprise, while using the typical tools and written instructions used by Cyber Security experts to perform network sniffing, monitoring, surveillance, and enumeration of data.

Objectives:
In the process of completing this course, students will learn the following main competencies to succeed in the field of cyber security and networking:
1. Install switches, routers and hubs, and configure them while reading instructions that outline specific protocols and addressing procedures which are at risk of intrusion.
2. Read, identify and distinguish the 3 key goals of network security: Confidentiality, Integrity, and Availability (CIA), in a medium to large computer network.
3. Implement security policies and standards as required for network protection and security.
4. Secure wireless networks, and test for intrusion, as well configuring for optimal protection such as MAC filtering and traffic encryption.
5. Install, and configure Intrusion Detection Systems (IDS) to meet the designed and written requirements given the range of threats in any combination of Physical, Network, or Communications elements of a given network.
6. Determine “Best Practices” in HTTPS, DNS, SMTP, and FTP servers to “harden” these resources against outside attacks, through research, reading professional journals, and publications.
7. Secure a given network using firewalls, and proxy servers, as well as specialized programs and tools.

Item 2. Catalog Description

This program provides students with the knowledge, training, and hands-on experience to pursue a career as an Information Technology Cyber Security Technician professional in a business, government, or education environment. Students completing this program of study will be able to enter the workforce with a comprehensive understanding of computer hardware, system software,

networking essentials, as well as the intermediate skills to protect computer networks against malicious attack, and to use currently available tools to perform network testing, penetration, and assessment of target networks

Item 3. Program Requirements

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Requirements	Dept. Name/#	Name	Units	Sequence
Required Core (15 units)	IS 15	Computer Concepts	3	Year 1/2, Fall
	IS 60	Operating Systems	2	Year 1, Fall
	IS 63	Computer Networking I	3	Year 1, Spring
	IS 70	Introduction to Cyber Security	3	Year 2, Fall
	IS 71	Cyber Security: Ethical Hacking	3	Year 2, Fall
	OT 17	Job Retention and Responsibilities	1	Year 1, Spring

Required Core Total: 15 units
TOTAL UNITS: 15 units

Proposed Sequence:
Year 1, Fall = 5 units
Year 1, Spring = 4 units
Year 2, Fall = 6 units
TOTAL UNITS: 15 units

Item 4. Master Planning

The stated goals of Reedley college and the district fits perfectly in this proposed cyber security certificate program. This program is an offshoot of an existing program started five years ago called information systems support.

Advisors from a wide spectrum of IT related disciplines were formed to become our advisory committee. With the help of these professionals we have designed and implemented a successful IT support certificate program. Most of our students who have completed our program have found full-time employment or successfully completed a four-year college program. It is on this framework that this proposed cyber security certificate program is being built. As documented in our current advisory committee minutes, there is a great need for specialists and experts in the cyber security profession. Current demographics and trends are perfect as an eventual outlet for our students upon completion of this certificate program. A recent study conducted by CompTIA, done in early 2017 shows the following:

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There are 6.9 million workers employed in the US tech industry

In 2016, there were 182,220 new jobs added driven largely by gains in IT services and custom software service

There are 492,550 new tech businesses established in the United States

California leads the nation in the tech industry employment

California's technology industry employment grew by an estimated 4.3% in 2016

California is home to an estimated 51,138 tech business establishments

Employers posted an estimated 88,637 job openings for tech occupations in the final three months of 2016
[1]

This Cyber Security certificate program supports the mission of Reedley College, by providing opportunity for our students to learn critical technology skills required to be successful in industry and academics. The latest publication of the department of labor predicts IT-Cyber security are expected to grow. A 2016 US white house work group under President Obama recommended a "ramp up" of over 100,000 cyber security workers in one year. IBM is hiring 25,000 workers, and the DOD and Cyber command are outsourcing their cyber security force to civilians.

The quality of the Reedley college Cyber Security program is carefully matched to the needs of end user's compliance with policy and procedures in cyber security industry, such as the Defense Security Service (DSS), Center for Development of Security Excellence (CDSE) Education Division, and CompTIA. The course of instruction meets or exceeds the expected quality of instruction found and offered at other California Community colleges.

Reedley college is uniquely equipped to offer the classes that are an integral part of the overall cyber security program, because of a large and separated lab, which has the area, and configurability for the equipment required for this type of instruction. Our lab is constructed of steel and thick cement - which make a perfect "Faraday Cage" that prevents wireless signals from emanating from the test areas. Additionally, the faculty are documented experts in cyber security and networking - the three main areas of CompTIA: A+; Network +; and Security +.

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[1] Source Cyberstates, 2017; Computing Technology Industry Association

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The quality of this program is carefully matched to existing front runners in the field, such as Defense Security Service (DSS), Center for Development of Security Excellence (CDSE) Education Division, and CompTIA the civilian counterpart in certification and DOD's partner with all things dealing with Cyber Security.

If approved this cyber security certificate program will be part of the business departments program review cycle, and curriculum committee, who is responsible for scheduling the periodic reviews, whereby academic departments determine the future needs and goals of the certificate program. Open enrollment will not be affected by the creation of this program or the subsequent modification through academic review, advisory committee's directives, and program review. Prerequisites and advisories for this program are limited in scope. Those that are in place are to ensure quality handoff of requisite knowledge through one class to another, and is scheduled sufficiently so that all students in a two-year period, has an opportunity to enroll in one of the very few prerequisite classes to satisfy the requirements for successful completion of this program. In addition, our relationship with our very strong advisory committee, does not rely upon tangible resources or use of facilities that would limit open enrollment. All the resources required for this cyber security program is available on campus and native to our own facilities, and thus will not affect open enrollment. In addition creation of this program or the subsequent modification through academic review, advisory committee's directives, and program review will not affect open enrollment.

Funding and maintenance for the program will follow the number of cycles we have in our existing program review. Initial expenditures for this project will be higher than the subsequent annual costs, which we anticipate as minimal. Virtually all the equipment, programs, and resources required for this program are readily available in the open market. All that is needed is high-end, and powerful computers, sufficient for a 20 to 25 student classroom/lab. In addition, the program would require standard industrial switches and servers. Costs for consumables (items such as connectors, ethernet cable, batteries, etc.) is included in the overall summary of costs.

The industry standard for the type of computers, and hardware we will use in the cyber security program longevity, as expressed by useful life, is 5 to 7 years. Replacement of our equipment would be gradually molded into a phase replacement plan, which fits closely to our existing program review cycle. This would ensure that the cost of replacing needed materials and equipment is staggered over the 5-7 years to ensure high end equipment is always available to teach innovative techniques, while at the same time keeping the costs of the program manageable, through financing the program over time. The following chart illustrates the overall costs, including a one-time start-up funding request in year 1.

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Cycle 1

Year	Equipment	Cost	Total Cost	Funding
Year 1	Initial startup: 20 *special* desktop computers, 2 switches, 4 servers, and 20 *special* laptops, racks and ladders. Consumables: Motherboards, CPU's and Memory	100,000 8,000	108,000	Perkins
Year 2	Consumables	8,000	116,000	Perkins
Year 3	Consumables	8,000	124,000	Perkins
Year 4	Consumables	8,000	132,000	Perkins
Year 5	Consumables	8,000	140,000	Perkins
Note	"*Special*" is a computer with 32GB of random access memory (RAM) and a CPU (central processing unit) capable of doing challenging and powerful manipulation of data, and processing of complex algorithms		Average cost per year: 28,000	Perkins

Cycle 2

Year	Equipment	Cost	Total Cost	Funding
Year 1	1 *special* desktop, 1 *special* laptop Consumables: Motherboards, CPU's and Memory	3,000 8,000	11,000	Perkins
Year 2	Consumables	8,000	11,800	Perkins
Year 3	Consumables	8,000	19,800	Perkins
Year 4	Consumables	8,000	27,800	Perkins

Year 5	Consumables	8,000	35,800	Perkins
Note	"Special" is a computer with 32GB of random access memory (RAM) and a CPU (central processing unit) capable of doing challenging and powerful manipulation of data, and processing of complex algorithms		Average cost per year: 7,160	

Item 5. Enrollment and Completer Projections

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		<Year 1>		<Year 2>	
CB01: Course Department Number	CB02: Course Title	Annual # Sections	Annual Enrollment Total	Annual # Sections	Annual Enrollment Total
IS-15	Computer Concepts	53	1254	45	1045
IS-60	Operating Systems	2	42	3	64
IS-63	Computer Networking I	2	42	3	64
IS-70	Introduction to Cyber Security	2	42	3	64
IS-71	Intro to Cyber Security: Ethical Hacking	2	42	3	64
OT-17	Job Retention and Responsibilities	6	120	6	124

*Use as many rows as required to provide requested data.

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Note: IS 70 Introduction to Cyber Security and IS 71 Cyber Security: Ethical Hacking are new courses which are planned for the 2018-2019 schedule.

As far as matching certificate and associate degree completers with job, the following chart lists the fastest growing occupations in the Reedley College service area. Information Technology is in the top 10 job growth areas, however we have data which suggest that IT jobs are available in the other top area of growth, namely Agricultural, Civil engineering, and medical. These businesses, always require IT support personnel, to run small networks, security systems, and other IT related areas.

2012-2022 Growing Occupations Requiring Associate Degree/Certificate/SomeCollege	
Fastest Growing	**Largest Growing**
Agricultural and Food Science Technicians	Agricultural and Food Science Technicians
Civil Engineering Technicians	Computer User Support Specialists
Computer User Support Specialists	Dental Assistants
Dental Assistants	Dental Hygienists
Dental Hygienists	First-Line Supervisors of Production and Operating Workers
Firefighters	Heavy and Tractor-Trailer Truck Drivers
First-Line Supervisors of Production and Operating Workers	Licensed Practical and LVN
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Medical and Clinical Laboratory Technicians
Heavy and Tractor-Trailer Truck Drivers	Medical Assistants
Licensed Practical and LVN	Nursing Assistants
Medical and Clinical Laboratory Technicians	Paralegals and Legal Assistants
Medical Assistants	Preschool Teachers, Except Special Education
Nursing Assistants	Registered Nurses
Paralegals and Legal Assistants	Teacher Assistants
Preschool Teachers, Except Special Education	
Radiologic Technologists	
Registered Nurses	
Skincare Specialists	
Surgical Technologists	
Teacher Assistants	

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Source: Employment Development Department, State of California

Item 6. Place of Program in Curriculum/Similar Programs

a) Do any active inventory records need to be made inactive or changed in connection with the approval of the proposed program? If yes, please specify.

No

b) Does the program replace any existing program(s) on the college's inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).

No

c) What related programs are offered by the college?

Information Systems CA
Information Systems, Information Technology Support Option AS
Information Systems, Networking AS
Information Systems, Networking CA
Information Systems, Programming for the Web CA

Item 7. Similar Programs at Other Colleges in Service Area

At the time of this writing, there are no similar programs offered by colleges with in the commuting distance of Reedley college which is the college service area for our region, which includes Madera Center and Oakhurst Center. Clovis community college is working on a similar program and have collaborated with the program manager here at Reedley. Course descriptions and numbering systems will be identical. There is a history of cross campus collaboration and teaching between the four campuses described here. There is a demand for this curriculum and the skills associated in the certificate program and at present the existing capacities at other colleges are insufficient to meet this demand.

Collaboration over the course of eight years and four separate campuses has laid the foundation for the current information systems support certificate of achievement program. This is an extension of that initial goal of building a world-class IT support education Center within the framework of CTE. Collaboration is ongoing, dynamic, and will continue. Faculty from these separate campuses participate in program review, conferences, and professional collaboration during staff development. There is little doubt that this professional collaboration will continue far into the future. In addition, all faculty who are involved in information systems in all the four locations, groom, mentor, and screen are adjunct professors to ensure the highest standards in accordance with all the professional organizations which set the standards for which we teach.