STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
CYBR 223 - NETWORK FUNDAMENTALS

CIP Code: 11.1003
For assistance determining CIP Code, please refer to this webpage
https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55
or reach out to Sarah Todd at todds@canton.edu

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Updated by:

School of Science, Health, and Criminal Justice

Department: Cybersecurity

Semester/Year: Fall 2024

A. TITLE: Network Fundamentals

B. COURSE NUMBER: CYBR 223

C. CREDIT HOURS: **(Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 3 **per week**
 # Lab Hours: **per week**
  Other: **per week**

Course Length: 15 **Weeks**

D. WRITING INTENSIVE COURSE: Yes ☐   No ☒

E. GER CATEGORY: **None:** ☒   **Yes:** GER
If course satisfies more than one: GER

F. SEMESTER(S) OFFERED: **Fall** ☐   **Spring** ☐   **Fall & Spring** ☒

G. COURSE DESCRIPTION:

A study of terminology, hardware and software associated with data communications and network technology with significant Cybersecurity perspectives. Areas of study include design principles for human-computer dialogue, selection criteria for communications devices, the technology of data transmission, techniques and message protocols for line control and error processing, local area networks, networking concepts, network topologies and access control, network performance, network services and design issues, and network media and access methods. Design, configuration, operation, maintenance, and security questions are explored. Topics include end-user perspective, network operating systems, cabling, hardware protocols, software and applications, design, and administration.

H. PRE-REQUISITES: **None** ☐   **Yes** ☒   **If yes, list below:**

CYBR 172 Computer Fundamentals or CYBR/CITA 170 Computer Concepts and Operating Systems

CO-REQUISITES: **None** ☒   **Yes** ☐   **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER [If Applicable]	ISLO & SUBSETS	
a. Describe the properties and limitations of data communications as implemented for the Internet model	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
b. Specify fundamental data transmission concepts underlying data communication practices used in business	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
c. Enumerate the hardware facilities and protocols required in communications systems	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
d. Explain the basic concepts and models of data communications and networks	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
e. Describe the components of data communications and network systems	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
f. Illustrate the protocols and standards required for networking and inter-networking	3. Use a variety of computer hardware and software and other technological tools appropriate and necessary for the performance of tasks		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
g. Specify network security issues and solutions	5. Analyze and resolve Cybersecurity problems through the application of systematic approaches, and complete all work in compliance with relevant policies, practices, processes, and procedures		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets

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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator

J.   APPLIED LEARNING COMPONENT: Yes ☒   No ☐

If YES, select one or more of the following categories:

☒ Classroom/Lab
☐ Internship
☐ Clinical Placement
☐ Practicum
☐ Service Learning
☐ Community Service

☐ Civic Engagement
☐ Creative Works/Senior Project
☐ Research
☐ Entrepreneurship
 (program, class, project)

K.   TEXTS:

Forouzan, B. (2022). Data Communications and Networking with TCP/IP Protocol Suite, 6/e. Columbus, OH: McGraw-Hill Higher Education.

L.   REFERENCES:

Internet resources selected by the instructor

M.   EQUIPMENT: **None** ☐   **Needed:** Computer lab classroom

N.   GRADING METHOD: A-F

O.   SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams/Quizzes/Assignments

P.   DETAILED COURSE OUTLINE:

I. Fundamentals of Network Technology
A. Network Models
B. History of Network Development

II. The Application Layer
A. Application architectures
B. Communications
C. Services
D. Protocols

III. The Transport Layer
A. Delivery protocols
B. Quality of service

IV. The Network Layer
A. Network models
B. Services
C. Addressing
D. Routing

V. The Data Link Layer
A. Data Transmission
B. Switches

VI. The Physical Layer
A. Communications Hardware
B. Types of Networks
C. Wireless and mobile technology
D. Multimedia

VII. Network Management
A. Administration
B. Performance and Optimization
C. Design Issues
D. Security Approaches

VIII. Network Security Issues and Solutions

Q.   LABORATORY OUTLINE: **None** ☒ **Yes** ☐