I. CATALOG INFORMATION

A. Discipline: COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

B. Subject Code and Number: CNSE M05

C. Course Title: Fundamentals of Computer Networking

D. Credit Course units:

Units: 4

Lecture Hours per week: 4

Lab Hours per week : 0

Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 70 - 70

Laboratory/Activity Hours:

Laboratory/Activity Hours 0 - 0

Total Combined Hours in a 17.5 week term: 70 - 70

F. Non-Credit Course hours per week

G. May be taken a total of: [X] 1 [ ] 2 [ ] 3 [ ] 4 time(s) for credit

H. Is the course co-designated (same as) another course: No [X] Yes [ ]
If YES, designate course Subject Code & Number:

I. Course Description:

Introduces the current networking hardware and software skills necessary to succeed in the dynamic field of networking. Includes networking fundamentals such as the networking standards and Open Systems Interconnection (OSI) model, transmission basics, network protocols, topologies and access methods, network operating systems, and troubleshooting and network security.

J. Entrance Skills

*Prerequisite: No [X] Yes [ ] Course(s)

*Corequisite: No [X] Yes [ ] Course(s)

Limitation on Enrollment: No [X] Yes [ ]

Recommended Preparation: No [X] Yes [ ] Course(s)

Other: No [X] Yes [ ]

K. Other Catalog Information:

Student should have knowledge and skills in accessing information on the Internet and basic computer skills such as using a word processor and email.

II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

		Methods of evaluation will be consistent with, but not limited by, the following types or examples.
1	list the advantages of networked computers relative to stand-alone computing.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
2	describe several specific uses for a network.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
3	describe the purpose of the Open Systems Interconnection (OSI) Model and each of its layers.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
4	explain specific functions belonging to each OSI Model layer.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
5	discuss the structure and purpose of data packets and frames.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
6	explain data transmission concepts including full-duplexing,	Quizzes Midterms Final exam

	attenuation, and noise.	Classroom project work demonstrating competency in this area
7	describe physical characteristics of coaxial cable, shielded twisted-pair (STP), unshielded twisted-pair (UTP), and fiber-optic media.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
8	identify the characteristics of Transmission Control Protocol/Internet Protocol (TCP/IP), Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), Network Basic Input Output System (NetBIOs), and AppleTalk.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
9	describe how key network protocols correlate to layers of the OSI Model.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
10	identify the functions of Local Area Network (LAN) connectivity hardware.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
11	describe the factors involved in choosing a network adapter, hub, switch, or router.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
12	describe the functions of repeaters, hubs, bridges, switches, routers, and gateways, and the OSI Model layers at which they operate.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
13	describe the basic and hybrid LAN physical topologies, and their	Quizzes Midterms Final exam

	uses, advantages, and disadvantages.	Classroom project work demonstrating competency in this area
14	compare the different types of switching used in data transmission.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
15	explain various Wide Area Network (WAN) topologies, including their advantages and disadvantages.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
16	describe a variety of WAN transmission and connection methods.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
17	describe the functions and features of a network operating system.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
18	define the requirements for a Windows Server network environment.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
19	identify similarities and differences between popular implementations of UNIX.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
20	explain how UNIX and Linux can be inter-networked with other	Quizzes Midterms Final exam

	operating systems.	Classroom project work demonstrating competency in this area
21	describe the methods of network design unique to TCP/IP networks, including subnetting, Classless Inter-Domain Routing CIDR), and network address translation (NAT).	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
22	explain the fundamental principles of using a TCP/IP network for packetized voice transmissions.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
23	describe the elements of an effective troubleshooting methodology.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
24	discuss practical issues related to troubleshooting.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
25	identify the characteristics of a network that keep data safe from loss or damage.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
26	describe the components of a useful disaster recovery plan.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
27	identify security risks in LANs and WANs.	Quizzes Midterms Final exam

		Classroom project work demonstrating competency in this area
28	explain how physical security contributes to network security.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
29	describe the elements and benefits of project management.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
30	describe the steps involved in upgrading network software and hardware.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area

III. COURSE CONTENT

Estimated %	Topic	Learning Outcomes
Lecture (must total 100%)		
6.00%	An Introduction to Networking	1, 2
8.00%	Networking Standards and the OSI Model	3, 4
8.00%	Transmission Basics and Networking Media	6, 7, 14
8.00%	Network Protocols	5, 8, 9
8.00%	Networking Hardware	10, 11, 12, 30
8.00%	Topologies and Access Methods	13, 15
8.00%	WANs, Internet Access, and Remote Connectivity	8, 15, 16, 27, 29, 30
6.00%	Network Operating Systems and Windows Server Based Networking	17, 18, 20
6.00%	Networking with UNIX-type of Operating Systems	19, 20
7.00%	In-Depth TCP/IP Networking	5, 8, 9, 21, 22
7.00%	Troubleshooting Network Problems	23, 24
7.00%	Ensuring Integrity and Availability	23, 24, 26, 29, 30

7.00%	Network Security	27, 28
6.00%	Implementing and Managing Networks	21, 23, 24, 25, 26, 27, 28, 29, 30

IV. TYPICAL ASSIGNMENTS

A. Writing assignments

Writing assignments are required. Possible assignments may include, but are not limited to:	
1	write a paper on course-related topics which may include providing schematics of proposed network topology designs.
2	short answer class assignments such as designing a network based on specific considerations such as number of workstations, office layout, budget, bandwidth requirements, sharing of files, data, and access to web services, as well as other considerations.

B. Appropriate outside assignments

Appropriate outside assignments are required. Possible assignments may include, but are not limited to:	
1	report based on field observations of networking technology as implemented in a local community.
2	assignments involving readings from the text and other sources, such as the Internet, on topics concerning computer networking.

C. Critical thinking assignments

Critical thinking assignments are required. Possible assignments may include, but are not limited to:	
1	design a subnet allocation model involving the number of hosts and networks based on Local Area Network and Wide Area Network requirements.
2	design a new subnet using Variable Length Subnet Mask (VLSM) design requirements.
3	design a network with server hosts based on Local Area Network and Wide Area Network requirements.

V. METHODS OF INSTRUCTION

Methods of instruction may include, but are not limited to:

[X] Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)

[X] Lecture/Discussion

[ ] Laboratory/Activity

[X] Other (Specify) Lecture notes
Study guides
PowerPoint presentations

Online Training videos

☐ Optional Field Trips

☐ Required Field Trips

VI. METHODS OF EVALUATION

Methods of evaluation may include, but are not limited to:

☒ Essay Exam	☒ Classroom Discussion	☐ Skill Demonstration
☒ Problem Solving Exam	☒ Reports/Papers/ Journals	☐ Participation
☒ Objective Exams	☒ Projects	☒ Other (specify)

Satisfactory completion of online assignments

VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS

Mansfield Jr., Kenneth, and James Antonakos. Computer Networking from LANs to WANs: Hardware, Software, and Security. Delmar Cengage Learning, 2010.

Pahlavan, Kaveh, and Prashant Krishnamurthy. Networking Fundamentals: Wide, Local and Personal Area Communications. Wiley, 2009.

VIII. STUDENT MATERIALS FEES

☒ No ☐ Yes

IX. PARALLEL COURSES

College	*Course Number*	*Course Title*	*Units*
Santa Barbara City College	CNEE 106	Telecommunications and WAN	3
De Anza College	CIS 67B	Introduction to Wide Area Networking	4

X. MINIMUM QUALIFICATIONS

Courses Requiring a Masters Degree:
Any bachelor's degree and two years of related technical experience, or any associate degree and six years of related technical experience.

XI. ARTICULATION INFORMATION

A. Title V Course Classification:

1. This course is designed to be taken either:

☐ Pass/No Pass only (no letter grade possible); or
☒ Letter grade (P/NP possible at student option)

2. Degree status:

Either ☒ Associate Degree Applicable; or ☐ Non-associate Degree Applicable

B. Moorpark College General Education:

1. Do you recommend this course for inclusion on the Associate Degree General Education list?
   Yes: ☐ No: ☒ If YES, what section(s)?

   ☐ A1 - Natural Sciences - Biological Science
   ☐ A2 - Natural Sciences - Physical Science
   ☐ B1 - Social and Behavioral Sciences - American History/Institutions
   ☐ B2 - Social and Behavioral Sciences - Other Social Behavioral Science
   ☐ C1 - Humanities - Fine or Performing Arts
   ☐ C2 - Humanities - Other Humanities
   ☐ D1 - Language and Rationality - English Composition
   ☐ D2 - Language and Rationality - Communication and Analytical Thinking
   ☐ E1 - Health/Physical Education
   ☐ E2 - PE or Dance
   ☐ F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:

1. Do you recommend this course for transfer credit to CSU? Yes: ☒ No: ☐
2. If YES do you recommend this course for inclusion on the CSU General Education list?
   Yes: ☐ No: ☒ If YES, which area(s)?

   A1 ☐ A2 ☐ A3 ☐ B1 ☐ B2 ☐ B3 ☐ B4 ☐

   C1 ☐ C2 ☐ D1 ☐ D2 ☐ D3 ☐ D4 ☐ D5 ☐

   D6 ☐ D7 ☐ D8 ☐ D9 ☐ D10 ☐ E ☐

D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes: ☐ No: ☒
2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes: ☐ No: ☒

   IGETC Area 1: English Communication

   ☐ English Composition
   ☐ Critical Thinking-English Composition
   ☐ Oral Communication

   IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

   ☐ Mathematical Concepts

   IGETC Area 3: Arts and Humanities

   ☐ Arts
   ☐

- [ ] Humanities

IGETC Area 4: Social and Behavioral Sciences

- [ ] Anthropology and Archaeology
- [ ] Economics
- [ ] Ethnic Studies
- [ ] Gender Studies
- [ ] Geography
- [ ] History
- [ ] Interdisciplinary, Social & Behavioral Sciences
- [ ] Political Science, Government & Legal Institutions
- [ ] Psychology
- [ ] Sociology & Criminology

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

- [ ] Physical Science Lab or Physical Science Lab only (none-sequence)
- [ ] Physical Science Lecture only (non-sequence)
- [ ] Biological Science
- [ ] Physical Science Courses
- [ ] Physical Science Lab or Biological Science Lab Only (non-sequence)
- [ ] Biological Science Courses
- [ ] Biological Science Lab course
- [ ] First Science course in a Special sequence
- [ ] Second Science course in a Special Sequence
- [ ] Laboratory Activity
- [ ] Physical Sciences

IGETC Area 6: Language other than English

- [ ] Languages other than English (UC Requirement Only)
- [ ] U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)
- [ ] U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

XII. REVIEW OF LIBRARY RESOURCES

A. What planned assignment(s) will require library resources and use?

The following assignments require library resources:
Research, using the Library's print and online resources, for a paper on an appropriate course topic such as developing schematics of proposed network topology designs.

B. Are the currently held library resources sufficient to support the course assignment?

YES: [X] NO: [ ]

If NO, please list additional library resources needed to support this course.

XIII. PREREQUISITE AND/OR COREQUISITE JUSTIFICATION

CNSE M05: Not Applicable

XIV. WORKPLACE PREPARATION

Required for career technical courses only. A career technical course/program is one with the primary goal to prepare students for employment immediately upon course/program completion, and/or upgrading employment skills.

Detail how the course meets the Secretary of Labors Commission on the Achievement of Necessary Skills (SCANS) areas. (For a description of the competencies and skills with a listing of what students should be able to do, go to: http://www.ncrel.org/sdrs/areas/issues/methods/assment/as7scans.htm)

The course will address the SCANS competency areas:

1. Resources: the students will identify, organize, plan and allocate resources through course work and application of theory to practice.
2. Interpersonal: the students will work together as a team to build, evaluate projects, and solve technical problem scenarios.
3. Information: the students will acquire and use information through a variety of assignments, network technology tools, and computer software used in computer network systems.
4. Systems: the students will employ a variety of computer tools to complete projects or assess computer networking problems.
5. Technology: the students will use modern technology to acquire the skills needed to prepare for a career.

The course also addresses the SCANS skills and personal qualities:

1. Basic Skills: the students will read, perform computer mathematic operations, listen and speak in order to complete weekly assignments and participate in classroom discussions.
2. Thinking Skills: the students will think creatively and make decisions in order to solve computer network problems and demonstrate reasonable problem solving skills.
3. Personal Qualities: the students will be required to display responsibility, self-management, integrity, and honesty throughout course work and classroom exercises.

XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM

1. Mode of Delivery

[X] Online (course will be delivered 100% online)

[X] Online with onsite examinations (100% of the instruction will occur online, but examinations and an orientation will be scheduled onsite)

[ ]

[X] Online/Hybrid (a percentage of instruction will be held online and the remaining percentage of instruction will be held onsite)

[ ] Lab activities will be conducted onsite

[ ] Televideo (Examinations and an orientation will be held onsite)

[ ] Teleconference

[ ] Other

2. Need/Justification

   Improve general student access.

3. Describe how instructors teaching this course will ensure regular, effective contact with and among students.

   The instructor will be available online and will monitor the distance learning online course. The instructor will use the available tools in the course management system (CMS) for two-way student/instructor communication. Instructor will use the CMS tools in order to provide assessments such as assignments and quizzes.

4. Describe how instructors teaching this course will involve students in active learning.

   Discussion boards. Other tools, online and PC resident, and forums will be used so that students can practice their skills as it applies to the course material. Through the course management system (CMS), materials will be made available online for download. Assessments for measuring understanding and student performance feedback will be made available through the CMS tools. Assignments, labs, and discussions will be available online.

5. Explain how instructors teaching this course will provide multiple methods of content representation.

   All topics are available for research online and align with CompTia Network+ curriculum. Videos and online discussion boards.

6. Describe how instructors teaching this course will evaluate student performance.

   Instructors will use quizzes, homework, labs, and exams to evaluate student performance.

XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM

CNSE M05: Not Applicable

XVII. STUDENT MATERIALS FEE ADDENDUM

CNSE M05: Not Applicable

XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041

CNSE M05: Not Applicable

XIX. CURRICULUM APPROVAL

Course Information:

Discipline:

COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

Discipline Code and Number: CNSE M05

Course Revision Category: Technical Course Revision

Course Proposed By:

Originating Faculty Edmond Garcia 08/25/2017

Faculty Peer: Edmond Garcia 08/25/2017

Curriculum Rep: _____

Department Chair: Navreet Sumal 09/02/2017

Division Dean: Howard Davis 08/28/2017

Approved By:

Curriculum Chair: Jerry Mansfield 10/13/2017

Executive Vice President: Julius Sokenu 10/13/2017

Articulation Officer: Letrisha Mai 09/21/2017

Librarian: Mary LaBarge 09/20/2017

Implementation Term and Year: Fall 2018

Approval Dates:

Approved by Moorpark College Curriculum Committee: 10/03/2017

Approved by Board of Trustees (if applicable): _____

Approved by State (if applicable): 11/04/0217