I. CATALOG INFORMATION

A. Discipline: COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

B. Subject Code and Number: CNSE M67

C. Course Title: VMware vSphere Fundamentals

D. Credit Course units:

Units: 3

Lecture Hours per week: 2.5

Lab Hours per week : 1.5

Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 43.75 - 43.75

Laboratory/Activity Hours:

Laboratory/Activity Hours 26.25 - 26.25

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:

Provides training using VMware's ESXi platform used by organizations which provide virtualized cloud computing systems. Teaches students how to manage virtual machines, virtual networks, and virtual storage and to administer vCenter Server. Requires students to perform labs dealing with data protection, authentication, monitoring virtual environments, high availability, scalability, patch management, and other VMware components.

J. Entrance Skills

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

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

Limitation on Enrollment: No [X] Yes [ ]

Recommended Preparation: No [ ] Yes [X] Course(s)
CNSE M30 or CNSE M31 or CNSE M55

Other: No [X] Yes [ ]

K. Other Catalog Information:

This course helps prepare students to pass VMware Certified Professional Exam.

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	install VMware vSphere program and related components.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
2	create virtual machines including latest Windows and Linux versions.	Quizzes Midterms Final Exam Classroom project work demonstrating competency in this area
3	create and manage virtual networks to support various virtual machine configurations.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
4	create and manage virtual storage to support virtual machines.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
5	administer changing virtual machine requirements.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
		Quizzes Midterms

6	configure data protection to support virtual machine configuration requirements.	Final exam Classroom project work demonstrating competency in this area
7	configure authentication, authorization and accounting/audit controls.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
8	configure resource management and monitoring to support hosted virtual machines.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
9	configure high availability and fault tolerance to support virtual machine requirement.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
10	configure host scalability to support changing host requirement.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
11	configure patch management to update VMware software.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area
12	install VMware vSphere components while ensuring guest/host availability.	Quizzes Midterms Final exam Classroom project work demonstrating competency in this area

III. COURSE CONTENT

Estimated %	Topic	Learning Outcomes
Lecture (must total 100%)		
10.00%	A. Architectures of Virtual Machines 1. Compare ESXi, VMware vSphere, and various VMware clients 2. Describe how vSphere interacts with components 3. Administer vSphere Client, ESXi, and command line effectively	1, 2, 3
7.00%	B. Virtual Machine 1. Components 2. Guest operating systems 3. VMware tools	2, 3, 12
10.00%	C. vCenter Server 1. Components and modules 2. Single sign-on 3. vSphere client 4. License keys	7, 12
7.00%	D. Manage Virtual Components 1. Virtual network 2. Virtual switch 3. Virtual components 4. Security in virtual environment	3, 4
8.00%	E. VMware vSphere Storage 1. Datastores 2. Naming conventions 3. vSphere storage appliance	4, 5, 6
8.00%	F. Templates 1. Cloning 2. VMware vSphere Storage vMotion 3. Migrations 4. Snapshots	1, 2, 12
7.00%	G. Backup and Restore 1. Issues and solutions related to virtual machines and VMware vCenter Server	6, 9
7.00%	H. VMware vSphere ESXi Firewall 1. Lockdown mode 2. Authentication 3. Roles and permissions 4. vShield 5. vSphere	7, 11, 12
7.00%	I. Symmetric Multi-Processing (SMP) 1. Hyperthreading 2. Memory 3. Resource allocation strategies	9, 10
7.00%	J. VMware vSphere High Availability 1. Failures 2. Fault tolerance 3. Replication 4. Heartbeats	9, 10
7.00%	L. VMware vSphere Update Manager 1. Baselines 2. Inventory objects 3. Remediation	11
	M. ESXi Installation	

7.00%	1. Boot-from-Storage Area Network (SAN) 2. Import and deploy appliances	3, 4, 5
8.00%	K. VMware vSphere 1. Distributed Resource Scheduler (DRS) cluster 2. Enhanced vMotion compatibility	9, 10
Lab (must total 100%)		
5.00%	Install VMsphere vSphere Graphical User Interfaces	1, 2, 3, 12
5.00%	Configure VMware ESXi	1, 2, 3, 12
5.00%	Working with Virtual Machines	2, 3, 4, 5
5.00%	Using VMware vCenter Server	1, 2, 12
5.00%	Standard Virtual Switches	3, 4, 5
5.00%	Accessing ISCSI (Internet Small Computer System Interface) Storage	4, 5
5.00%	Accessing Internet Protocol (IP) Storage	4, 5
5.00%	Managing VMware vSphere VMFS (Virtual Machine File System)	3, 4, 5, 6
5.00%	Using Templates and Clones	2, 3, 4, 6, 12
5.00%	Modifying a Virtual Machine	1, 2, 3
5.00%	Migrating Virtual Machines	2, 3, 4, 5
5.00%	Managing Virtual Machines	2, 3, 4, 5, 6, 7
5.00%	Managing vApps	7, 10, 11, 12
5.00%	Access Control	7, 8
5.00%	User Permissions	7, 8, 9
5.00%	Resource Pools	8, 9, 10
5.00%	Monitoring Virtual Machine Performance	8, 9, 10, 11, 12
5.00%	Configure and Manage Alarms	2, 5, 9, 10, 12
5.00%	Using vSphere High Availability	11, 12
5.00%	Designing a Network Configuration	3, 4, 12

IV. TYPICAL ASSIGNMENTS

A. Writing assignments

Writing assignments are required. Possible assignments may include, but are not limited to:	
1	keep a lab journal that addresses problems, solutions, and configuration options.
2	write an explanation/analysis of the benefits of various configuration options of VMware after doing assigned readings on the subject.

B. Appropriate outside assignments

Appropriate outside assignments are required. Possible assignments may include, but are not limited to:	
1	research related topics to support classroom lab exercises, such as cloud computing designs posted online.

2	research VMware manuals to support classroom lab exercises on specific topics such as clustering, failover, redundancy, security, performance, and scalability.

C. Critical thinking assignments

Critical thinking assignments are required. Possible assignments may include, but are not limited to:	
1	configure lab solutions related to clustering, failover, redundancy, security, performance, and scalability.
2	solve lab scenarios to meet business requirements, such as backing up and clustering a virtual machine.

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

[X] Laboratory/Activity

[X] Other (Specify) Use VMware Academy-provided PowerPoint presentations
Case studies

[ ] Optional Field Trips

[ ] Required Field Trips

VI. METHODS OF EVALUATION

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

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

Evaluation will include traditional assessment of theory but will also include assessment through various lab scenarios

VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS

Ferguson, Bill. vSphere 6 Foundatons Exam; Official Cert Guide: VMware Certified Professional 6. VMware Press, 2016.

Davis, John, Steve Baca, and Owen Thomas. VCP6-DCV Official Cert Guide (Exam #2VO-621). 3rd ed. VMware Press, 2016.

Marshall, Nick. Mastering VMware vSphere 6. Sybex, 2015.

VIII. STUDENT MATERIALS FEES

[X] No [ ] Yes

IX. PARALLEL COURSES

College	*Course Number*	*Course Title*	*Units*
Coastline Community College	C S T C111	VMware vSphere	3
Santa Barbara City College	CIS 219	VMware vSphere System Administration	3
Cypress College	CIS 202 C	Vmware Virtualization Network	3
Ohlone College	CNET 120	VMware: Install, Configure, Manage	2

X. MINIMUM QUALIFICATIONS

Courses in Disciplines in which Masters Degrees are not expected:
Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional 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
   [X] Letter grade (P/NP possible at student option)

2. Degree status:
   Either [X] 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: [X] 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: [X] 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, on virtualization topics such as clustering, redundancy, operating systems, etc.

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 M67: 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 and 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, for example use tools provided by VMware and tools provided by the operating system vendors.

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 mathematical operations, listen and speak for 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 VMware curriculum, including Videos, network illustrations and lab equipment schematics.

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

   Quizzes, homework, exams, and lab performance and assessment tools.

XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM

CNSE M67: Not Applicable

XVII. STUDENT MATERIALS FEE ADDENDUM

CNSE M67: Not Applicable

XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041

CNSE M67: Not Applicable

XIX. CURRICULUM APPROVAL

Course Information:

Discipline:
COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

Discipline Code and Number: CNSE M67

Course Revision Category: Technical Course Revision

Course Proposed By:

Originating Faculty Edmond Garcia 10/10/2017

Faculty Peer: Edmond Garcia 10/10/2017

Curriculum Rep: _____

Department Chair: Navreet Sumal 10/11/2017

Division Dean: Howard Davis 11/02/2017

Approved By:

Curriculum Chair: Jerry Mansfield 03/07/2018

Executive Vice President: Julius Sokenu 03/17/2018

Articulation Officer: Jodi Dickey 02/27/2018

Librarian: Mary LaBarge 02/26/2018

Implementation Term and Year: Fall 2018

Approval Dates:

Approved by Moorpark College Curriculum Committee: 03/06/2018

Approved by Board of Trustees (if applicable): _____

Approved by State (if applicable): 03/22/2018