

Eastern Illinois University
New/Revised Course Proposal Format
(Approved by CAA on 4/3/14 and CGS on 4/15/14, Effective Fall 2014)

CGS Agenda Item: 22-23
Effective Fall 2022

Banner/Catalog Information (Coversheet)

1. ☒ **New Course** or ☐ **Revision of Existing Course**
2. **Course prefix and number:** CIT 4883
3. **Short title:** Virtualization Technologies
4. **Long title:** Virtualization Technologies
5. **Hours per week:** 2 Class 2 Lab 3 Credit
6. **Terms:** ☐ Fall ☐ Spring ☐ Summer ☒ On demand
7. **Initial term:** ☒ Fall ☐ Spring ☐ Summer Year: 2022
8. **Catalog course description:** This Virtualization Technology course allows students to gain the knowledge and skills to successfully install, configure, manage, and deploy virtual servers and workstations in an organization. They will learn how to choose the proper virtual machine product for an environment, partition servers to isolate applications, improve portability and migration, and create entire testing labs within a single PC. Hands-on exercises will provide practical experience with scripting administrative tasks, customizing virtual networks and clustering virtual machines.

9. Course attributes:

General education component: N/A

☐ Cultural diversity ☐ Honors ☐ Writing centered ☐ Writing intensive ☐ Writing active

☐ Department Capstone as Senior Seminar

10. Instructional delivery

Type of Course:

☐ Lecture ☐ Lab ☒ Lecture/lab combined ☐ Independent study/research

☐ Internship ☐ Performance ☐ Practicum/clinical ☐ Other, specify: _____

Mode(s) of Delivery:

☒ Face to Face ☒ Online Synchronous ☒ Online Asynchronous ☐ Study Abroad

☒ Hybrid, specify approximate amount of on-line and face-to-face instruction ~ 51% Face-to-face and 49% online

11. Course(s) to be deleted from the catalog once this course is approved:

12. Equivalent course(s): TEC 5883

a. Are students allowed to take equivalent course(s) for credit? ☐ Yes ☒ No

13. Prerequisite(s): CIT 2523 OR TEC 5313

a. Can prerequisite be taken concurrently? ☐ Yes ☒ No

b. Minimum grade required for the prerequisite course(s)? C

c. Use Banner coding to enforce prerequisite course(s)? ☒ Yes ☐ No

d. Who may waive prerequisite(s)?

☐ No one ☒ Chair ☒ Instructor ☒ Advisor ☐ Other (specify)

14. Co-requisite(s): none

15. Enrollment restrictions

a. Degrees, colleges, majors, levels, classes which may take the course: Students of major in CIT or TEC or DGT or permission of instructor

b. Degrees, colleges, majors, levels, classes which may not take the course: All Others

16. Repeat status: ☒ May not be repeated ☐ May be repeated once with credit

17. Enter the limit, if any, on hours which may be applied to a major or minor: 3

18. Grading methods: ☒ Standard ☐ CR/NC ☐ Audit ☐ ABC/NC

19. Special grading provisions:

☐ Grade for course will not count in a student's grade point average.

☐ Grade for course will not count in hours toward graduation.

☐ Grade for course will be removed from GPA if student already has credit for or is registered in:

☐ Credit hours for course will be removed from student's hours toward graduation if student already has credit for or is registered in: _____

20. Additional costs to students:

Supplemental Materials or Software _____

Course Fee ☒ No ☐ Yes, Explain if yes _____

21. Community college transfer:

☐ A community college course may be judged equivalent.

☒ A community college may not be judged equivalent.

Note: Upper division credit (3000+) will not be granted for a community college course, even if the content is judged to be equivalent.

Rationale, Justifications, and Assurances (Part I)

1. ☐ Course is required for the major(s) of _____
☐ Course is required for the minor(s) of _____
☐ Course is required for the certificate program(s) of _____
☒ Course is used as an elective

2. Rationale for proposal:

Computer and Information Technology is a profession expected to grow 13 % each year till 2026 according to the Bureau of Labor Statistics. In Illinois alone, this equates to several hundreds of jobs each year. As a result, this course is being developed to cover the latest trends and topics in the Computer Information and Technology program. Currently, there is no coursework that is flexible for students seeking knowledge in this area online or in a hybrid format.

As Computer and Information Technology program has grown, there is a need from the Industry to introduce courses such as this. The content of this course helps CIT students attain more “in-demand” skills, as well as this course, will assist in meeting accreditation requirements from the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

3. Justifications for (answer N/A if not applicable)

Similarity to other courses: As graduate students are allowed to take only 3 undergraduate courses, the TEC 5883 – Advanced Virtualization Technologies course is there to enrich the graduate program, while this course will primarily serve the undergraduate program.

Prerequisites: this course builds on the knowledge gained in the course CIT 2523 or TEC 5313.

Co-requisites: N/A

Enrollment restrictions:

Advance content is only appropriate for the students in the CIT, DGT or the TEC program

Writing active, intensive, centered: N/A

4. General education assurances (answer N/A if not applicable)

General education component: N/A

Curriculum: N/A

Instruction: N/A

Assessment: N/A

5. Online/Hybrid delivery justification & assurances (answer N/A if not applicable)

Online or hybrid delivery justification:

The content and structure for this course relies upon independent research, in-depth group discussion, and video-based lecture. As compared to many lab courses already offered in technology area, this

course requires online delivery of lectures and discussions and face-to-face lab activities for applied projects. For content delivered online, the course employs online video presentations, structured web discussions focused on reading assignments, and linked to articles submitted to the instructor. Students are required to draw on research and review of articles to discuss and develop fundamental procedural knowledge of application. Discussions invite students to explore in more detail the required knowledge and procedures to analyze and design systems. Discussions and examinations will be administered and submitted via the online course management tool. With the current technology, many software design companies have made their software tools more readily accessible for students. The Internet connection speed for many users has increased thereby allowing for higher quality rich media instruction to be delivered. Finally, the course management tools that the university now uses allow there to be a richer interaction between students and faculty. To accommodate this situation, many of the given activities may be completed in a hybrid format.

Instruction:

This course employs instructor-led online presentations, student reading assignments, student applied design assignments, peer critique and troubleshooting, student presentations, and examinations. After reviewing the instructor-led presentations and completing the student reading assignments, students will be required to draw on what they have read and then apply it to a context of analyzing and designing software systems. While working on these projects, students may engage in the activity of troubleshooting or critique while posting their work in an online discussion board for both classmates and the instructor to provide feedback and guidance. Presentations will provide learners a forum to share the results of their work and receive further feedback. Reading assignments, applied projects, and examinations will be administered, collected, and/or submitted via the online course management tool. Presentations may also be delivered in the course tool or face-to-face. All faculty who will deliver this course online are/will be OCDi (or appropriate equivalent) trained.

Integrity:

Work submitted online, such as discussions and examinations, will be substantiated via learners providing citations in APA format and submitting related articles to quantify work. Further, the length, frequency, quality, and integrity of discussion posts can be monitored via the online course management tool. Examinations will require the same of learners and additionally will use software tools, such as "TURNITIN", to check work for the integrity and authenticity of submitted assignments. The examinations will be time-restricted and of sufficient length to prohibit consultation of unauthorized sources. Work submitted face-to-face in applied lab projects will be checked for authenticity via the individualized nature of project completion. Requirements for projects will require learners to engage in activities that require the creation of original content for either themselves or local entity.

Interaction:

For online content, the course employs email, web-based discussions, exploration of off-site Internet resources, web-based presentations, web chat rooms and lab based applied project work. The instructor will communicate with students through the online discussion board and web-based discussions. Email may also be a tool used for the instructor to communicate with an individual student or to post course announcements. The learners for this course may also communicate with one another for these tools. During digital office hours, the instructor will remain available for discussion during certain times and communicate using a chat room tool in the learning management system. For face-to-face interaction, the instructor may communicate synchronously with the learners during open lab activities and during office hours. The learners are also free to communicate with other learners during lab activities.

Model Syllabus (Part II)

Please include the following information:

1. Course number and title

CIT 4883 – Virtualization Technologies

2. Catalog description

This Virtualization Technology course allow students to gain the knowledge and skills to successfully install, configure, manage, and deploy virtual servers and workstations in an organization. They will learn how to choose the proper virtual machine product for an environment, partition servers to isolate applications, improve portability and migration, and create entire testing labs within a single PC. Hands-on exercises will provide practical experience with scripting administrative tasks, customizing virtual networks and clustering virtual machines.

3. Learning objectives.

Upon completion of this course, students will be able to:

- a. Demonstrate how a hypervisor makes server virtualization possible (CT 1-6, WCR 1-5, SL 1-7, QR 1-6, Grad 1, 3)
- b. Appraise how virtualization improves availability, data protection, performance, and business agility (CT 1-5, WCR 1-7, SL 1-7, QR 1-6, RC 1-2, Grad 1-5)
- c. Test and deploy server virtualization and storage virtualization (CT 1-6, WCR 1-5, SL 1-7, QR 1-6, Grad 1-4)
- d. Adapt virtual machines from one hypervisor to another and then to a cloud service (CT 1-6, WCR 1-5, SL 1-7, QR 1-6, Grad 1,2, 4)
- e. Leverage VMs to build testing, support, and training environments to complete a project and publish a report. (CT 1-6, WCR 1-7, SL 1-7, QR 1-6, RC 1-4, Grad 1-5)

4. Course materials.

This will include lecture notes, online resources (such as online tutorials, research papers), etc. The following textbook is an example of the textbook that will be used in class:

Portnoy, M. (2016). *Virtualization Essentials* (2nd ed.). Sybex.

5. Weekly outline of content.

Face-to-Face / Online Modality:

Week	Topics	Activities
Week 1	Introduction to Virtualizations	
Week 2	Install ESXi Server according to best practices	ESXi Lab
Week 3	-Install, configure and update the Platform Service Controller and vCenter Server Appliance -Configure and manage local storage	PSC Lab
Week 4	Create virtual, distributed virtual, and virtual to physical LAN segments	LAN Lab
Week 5	Define and use file share (NAS) datastores	NAS Lab
Week 6	Create and use Content Libraries to manage ISO repositories	Content Libraries Lab
Week 7	Create virtual machines, install operating systems and applications	VM Lab
Week 8	Midterm Exam	
Week 9	Configure, manage, monitor and secure users and groups	Configuration Lab
Week 10	Rapidly deploy VMs using golden-master templates and create clones	Golden Master Lab
Week 11	Perform VM cold migrations, hot migrations and Storage VMotion as well as Use Host Profiles to set and enforce ESXi configuration rule sets	Migration Lab
Week 12	Deploy and use VMware Replication to hot back up and recover critical Virtual Machines	Replication Lab
Week 13	Understand, create and manage high availability clusters to protect against VM service loss caused by ESXi server failures	HA Lab
Week 14	Configure VMs for zero unplanned downtime by deploying vSphere Fault Tolerance	Fault Tolerance Lab
Week 15	Patch and update ESXi servers using vCenter Update Manager Troubleshoot common problems	vCenter Lab
Week 16	Final Exam	

Hybrid Modality:

Week	Topics	Activities
Week 1	Introduction to Virtualizations	
Week 2	Install ESXi Server according to best practices	ESXi Lab
Week 3	-Install, configure and update the Platform Service Controller and vCenter Server Appliance -Configure and manage local storage	PSC Lab
Week 4	Question/Answers/Review Sessions of Weeks 1 to 3 Create virtual, distributed virtual, and virtual to physical LAN segments	LAN Lab
Week 5	Define and use file share (NAS) datastores	NAS Lab
Week 6	Create and use Content Libraries to manage ISO repositories	Content Libraries Lab
Week 7	Create virtual machines, install operating systems and applications	VM Lab
Week 8	Question/Answers/Review Sessions of Weeks 5 to 7	Presentations

	Midterm Exam	
Week 9	Configure, manage, monitor and secure users and groups	Configuration Lab
Week 10	Rapidly deploy VMs using golden-master templates and create clones	Golden Master Lab
Week 11	Perform VM cold migrations, hot migrations and Storage VMotion as well as Use Host Profiles to set and enforce ESXi configuration rule sets	Migration Lab
Week 12	Deploy and use VMware Replication to hot back up and recover critical Virtual Machines	Replication Lab
Week 13	Question/Answers/Review Sessions of Weeks 9 to 12 Understand, create and manage high availability clusters to protect against VM service loss caused by ESXi server failures	HA Lab
Week 14	Configure VMs for zero unplanned downtime by deploying vSphere Fault Tolerance	Fault Tolerance Lab
Week 15	Patch and update ESXi servers using vCenter Update Manager Troubleshoot common problems	vCenter Lab
Week 16	Final Exam	Presentation

6. Assignments and evaluation, including weights for final course grade.

	Undergraduate (UG)	Graduate (G)
Labs	55 %	50 %
Class Participation	5 %	5 %
Presentation	5%	5%
Projects	N/A	10%
Exams	35 %	30 %
Total	100 %	100 %

7. Grading scale.

A = 90% or above, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, F = Below 60%

8. Correlation of learning objectives to assignments and evaluation.

Objective	Labs (UG: 55%, G 50%)	Class Participation (UG 5%, G 5%)	Presentation (UG: 5%, G: 5%)	Projects (G: 10%)	Exams (UG 35%, G: 30%)
a. Demonstrate how a hypervisor makes server virtualization possible (CT 1-6, WCR 1-5, SL1-7, QR 1-6, Grad 1,3)	X	X		X	X
b. Appraise how virtualization improves availability, data protection, performance, and business agility (CT 1-5, WCR 1-7, SL1-7, QR 1-6, RC 1-2, Grad 1-5)	X	X		X	X

c. How to test and deploy server virtualization and storage virtualization (CT 1-6, WCR 1-5, SL1-7, QR 1-6, Grad 1-4)	X	X		X	X
d. Adapt virtual machines from one hypervisor to another and then to a cloud service (CT 1-6, WCR 1-5, SL1-7, QR 1-6, Grad 1,2, 4)	X	X		X	X
e. Leverage VMs to build testing, support, and training environments to complete a project and publish a report. (CT 1-6, WCR 1-7, SL1-7, QR 1-6, RC 1-4, Grad 1-5)	X	X	X	X	X

Date approved by the department or school: 11/29/2021

Date approved by the college curriculum committee: 12/16/2021

Date approved by the Honors Council (*if this is an honors course*):

Date approved by CAA: **CGS:**