CGS Agenda Item: 21-56
Effective Fall 2022

Eastern Illinois University

New/Revised Course Proposal Format

(Approved by CAA on 4/3/14 and CGS on 4/15/14, Effective Fall 2014)

Banner/Catalog Information (Coversheet)

1. **__X__New Course or _____Revision of Existing Course**
2. **Course prefix and number:** _TEC 5883_____
3. **Short title:** _Advanced Virtualization Tech. _____
4. **Long title:** __ Advanced Virtualization Technologies _____
5. **Hours per week:** __2_ Class _2__ Lab _3__ Credit
6. **Terms:** ___ Fall ___ Spring ___ Summer _X__ On demand
7. **Initial term**: _X__ 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 _X_ Lecture/lab combined ___ Independent study/research

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

    Mode(s) of Delivery:

    _X__ Face to Face __X_ Online Synchronous _X_ Online Asynchronous ___ Study Abroad

    _X_ 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):** __CIT 4883_____

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

13. **Prerequisite(s): __CIT 2523 OR TEC 5313_____**

    a. **Can prerequisite be taken concurrently?** ___ Yes _X__ No

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

    c. **Use Banner coding to enforce prerequisite course(s)?** __X_ Yes ___ No

    d. **Who may waive prerequisite(s)?**

    ___ No one _X__ Chair _X__ Instructor __X_ Advisor ___ Other (specify)

14. **Co-requisite(s):** __none_____

15. **Enrollment restrictions**

    a. **Degrees, colleges, majors, levels, classes which <u>may</u> take the course:** _ Students of major in CIT or TEC or DGT or permission of instructor_____

    b. **Degrees, colleges, majors, levels, classes which may <u>not</u> take the course:** _All Others_____

16. **Repeat status:** _X__ 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:** _X__ Standard ___ CR/NC __ Audit ___ ABC/NC

19. **Special grading provisions:**

    ___ Grade for course will <u>not</u> count in a student's grade point average.

    ___ Grade for course will <u>not</u> 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 _X__No ___Yes, Explain if yes_____

21. **Community college transfer:**

    ___ A community college course may be judged equivalent.

    _X__ A community college may <u>not</u> be judged equivalent.

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

<u>Rationale, Justifications, and Assurances (Part I)</u>

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 _____
   _X__ Course is used as an elective
2. **Rationale for proposal**:

   Graduate students in Technology are required to take a minimum of 19 hours of elective courses numbered 5000 and above. Currently, we offer fewer courses at 5000 and above in the computer domain in the graduate program of Technology. As graduate students are allowed to take only 3 undergraduate courses, this course is being introduced to enrich the graduate program

   The Computer Technology profession is expected to grow 15 % each year till 2029 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 satisfy the Industry needs for our students to have knowledge of the latest trends and topics in the Computer Technology domain. The content of this course helps the students attain more "in-demand" skills. Currently, there is no coursework that is flexible for students seeking knowledge in this area online or in a hybrid format.

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

   Similarity to other courses: As graduate students are allowed to take only 3 undergraduate courses, this course is being introduced to enrich the graduate program

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

   Co-requisites: N/A

   Enrollment restrictions: Advance content is only appropriate for the students in the CIT, DGT and 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

TEC 5883 – Advanced Virtualization Technologies

2. Catalog 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.

3. Learning objectives.

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

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

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 Midterm Exam	Presentations
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	Final Project

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

	Graduate
Labs	50 %
Class Participation	5 %
Presentation	5%
Projects	10%
Exams	30 %
Total	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** 45%	**Class Participation** 5%	**Presentation 5%**	**Projects** 10%	**Exams** 35%
a. Demonstrate how a hypervisor makes server virtualization possible (Grad 1, 3)	X	X		X	X
b. Appraise how virtualization improves availability, data protection, performance, and business agility (Grad 1 – 5)	X	X		X	X
c. How to test and deploy server virtualization and storage virtualization (Grad 1 – 4)	X	X		X	X
d. Adapt virtual machines from one hypervisor to another and then to a cloud service (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. Grad (1 – 5)	X	X	X	X	X

Date approved by the department or school: 11/29/21
Date approved by the college curriculum committee: 12/16/21
Date approved by the Honors Council ***(if this is an honors course):***
Date approved by CAA: **CGS:**