

# **TDC-478**

## **Information Storage and Management**

### **Autumn 2018**

**Instructor:** Joe Cannici  
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Class Hours: Monday's 5:45 – 9:00

#### **Course Overview:**

This course is designed to provide a comprehensive introduction to storage technology and networking issues as they relate to the information storage infrastructure. It builds a strong understanding of underlying storage technologies and prepares students to learn advanced concepts and technologies. Major topics covered include the architectures, features, and benefits of Intelligent Storage Systems; networked storage technologies such as FC-SAN, NAS, and IP-SAN; long-term archiving solutions such as CAS; as well as the increasingly critical area of information security and the emerging field of storage virtualization technologies.

#### **Course Breakdown:**

15% - Exercises (3 – 5% each)  
20% - Lab  
15% - Homework (3 – 5% each)  
25% - Midterm Exam  
25% - Final Exam

#### **Prerequisites:**

None

#### **Textbook (Optional):**

Information Storage and Management, G. Somasundaram, A. Shrivastava, J. Wiley, 2012. ISBN: 978-1-118-09483-9.

#### **Exercises:**

Two practical exercises will be required during the quarter. Late exercise submissions will not be accepted...**no exceptions.**

**Lab:**

One storage system lab will be required during the quarter. Late labs will not be accepted...**no exceptions.**

**Homework:**

Four homework assignments based on the textbook reading will be given during the term. Homework must be submitted via COL. Late homework submissions will not be accepted...**no exceptions.**

**Cell Phones:**

As a courtesy to the other students and the instructor: If you must keep your cell phone on, *please* turn the ringer off and set the phone in front of you, or place cell phone on vibrate mode.

**Class Notes:**

All of the slides used during lecture are available on the course web site. A hard copy of the first lecture will be handed out in class. All future hard copies are your responsibility. To print them, I suggest printing three slides to a page (to save paper). To do this in PowerPoint, click on File/Print/Print what: Handouts/Slides per page: 6.

**Grading Scale:**

92 – 100	A	72 – 77	C
90 – 91	A-	70 – 71	C-
88 – 89	B+	68 – 69	D+
82 – 87	B	62 – 67	D
80 – 81	B-	60 – 61	D-
78 – 79	C+	0 – 59	F

**Changes to Syllabus:**

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted under Announcements in D2L and sent via email.

**Online Course Evaluations:**

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in CampusConnect.

**Academic Integrity and Plagiarism:**

This course will be subject to the university's academic integrity policy. More information can be found at <https://resources.depaul.edu/teaching-commons/teaching/academic-integrity/Pages/default.aspx>.

**Academic Policies:**

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at: <http://www.cdm.depaul.edu/Current%20Students/Pages/PoliciesandProcedures.aspx>.

**Incomplete Grades:**

An incomplete grade is a special, temporary grade that may be assigned by an instructor when unforeseeable circumstances prevent a student from completing course requirements by the end of the term and when otherwise the student had a record of satisfactory progress in the course. All incomplete requests must be approved by the instructor of the course and a CDM Associate Dean. Only exceptions cases will receive such approval. Information about the Incomplete Grades policy can be found at <http://www.cdm.depaul.edu/Current%20Students/Pages/Grading-Policies.aspx>

**Students with Disabilities:**

Students seeking disability-related accommodations are required to register with DePaul's Center for Students with Disabilities (CSD) enabling them to access accommodations and support services to assist with their success. There are two office locations:

- Loop Campus – Lewis Center #1420 – (312) 362-8002
- Lincoln Park Campus – Student Center #370 – (773) 325-1677

Students who register with the Center for Students with Disabilities are also invited to contact Dr. Gergory Moorhead, Director of the Center, privately to discuss how he may assist in facilitating the accommodations to be used in a course. This is best done early in the term. The conversation will remain confidential to the extent possible.

Please see <https://offices.depaul.edu/student-affairs/about/departments/Pages/csd.aspx> for Services and Contact Information.

**Proctored exams for OL courses**

If you are an online learning student living in the Chicagoland area (within 30 miles of Chicago), you will need to come to the Loop campus to take an exam. Online learning students outside of the Chicagoland area are required to locate a proctor at a local library, college or university. You will need to take the exam within the window your instructor gives. Students should examine the course syllabus to find exam dates and the instructor's policy on make-up exams. Detailed information on proctored exams for online learning students can be found at <http://www.cdm.depaul.edu/onlinelearning/Pages/Exams.aspx>

**Objectives:**

Upon completion of the course, the student will understand:

- The value of information today
- The business needs that storage networking addresses
- Trends and opportunities within the industry
- Key applications and markets
- The storage networking value proposition
- The leading industry vendors
- The components of a Direct-Attached Storage (DAS)
- The components of a Network-Attached Storage (NAS)
- The components of a Storage Area Network (SAN)
- The various SAN topologies
- The various storage networking solutions
- Fibre Channel architecture
- Storage-over-IP technologies: FCIP, iFCP, and iSCSI
- How emerging storage networking technologies could have a dramatic impact on the storage networking industry in the near future
- Server clustering
- High-availability configurations
- Backup and disaster recovery
- Data replication
- Three techniques for managing volume allocation
- HSM and Virtualization
- Application-aware resource management
- Some of the important considerations for choosing management solutions
- The SAN components that require periodic revision level upgrades
- The common challenges in performing firmware upgrades
- Basic networking monitoring tasks
- Performance considerations for Fibre Channel arbitrated loops
- High-availability fabric topologies and their strengths and limitations
- Active/passive and active/active high-availability configurations
- Application performance considerations
- The key challenges in backup and recovery management
- Storage Networking Technologies
- Interoperability Issues
- Functionality Issues

Approximate outline:

Week	Date	Topics	Module	ISM v2 Chapter Reading
1	9/10	Introduction to Information Storage and Management Third Platform Technologies	1 2	1 13
2	9/17	Data Center Environment Intelligent Storage System (ISS)	3 4	2 4
3	9/24	Block-based Storage System File-based Storage System (NAS) <b>Homework #1 Due</b>	5 6	7
4	10/1	Object-based and Unified Storage Software-Defined Storage <b>Exercise #1 Due</b>	7 8	8
5	10/8	Fibre Channel (FC) SAN <b>Homework #2 Due</b>	9	5
6	10/15	<b>Midterm Exam</b>		
7	10/22	Internet Protocol (IP) SAN FC over Ethernet (FCoE) SAN	10 11	6 6
8	10/29	Introduction to Business Continuity Backup and Archive <b>Homework #3 Due</b>	12 13	9 10
9	11/5	Replication Securing the Storage Infrastructure <b>Exercise #2 Due</b>	14 15	11, 12 14
10	11/12	Managing the Storage Infrastructure <b>Exercise #3 Due</b>	16	15
11	11/19	<b>Final Exam</b> <b>Lab Due</b>		

**Academic Integrity:**

Violations of academic integrity, particularly plagiarism, are not tolerated. Plagiarism is defined by the university as:

*“..a major form of academic dishonesty involving the presentation of the work of another as one's own. Plagiarism includes but is not limited to the following:*

- a. The direct copying of any source, such as written and verbal material, computer files, audio disks, video programs or musical scores, whether published or unpublished, in whole or part, without proper acknowledgement that it is someone else's.*
- b. Copying of any source in whole or part with only minor changes in wording or syntax, even with acknowledgement.*
- c. Submitting as one's own work a report, examination paper, computer file, lab report or other assignment that has been prepared by someone else. This includes research papers purchased from any other person or agency.*
- d. The paraphrasing of another's work or ideas without proper acknowledgement.*

*Plagiarism, like other forms of academic dishonesty, is always a serious matter. If an instructor finds that a student has plagiarized, the appropriate penalty is at the instructor's discretion. Actions taken by the instructor do not preclude the college or the university from taking further punitive action including dismissal from the university” (DePaul Student Handbook).*

This course will be subject to the university's academic integrity policy. More information can be found at <http://academicintegrity.depaul.edu>. If you have any questions be sure to consult with your professor.