

**COURSE:**

AIT 664: Information: Representation, Processing and Visualization

**DESCRIPTION:**

This course is aimed at educating information professionals on basic concepts to understand and analyze the design of information systems. The course material focuses on key conceptual questions about information such as what is information and what is knowledge, what are differences and boundaries in representing and processing information for humans and machines, what is information theory, what are basic techniques to organize, and structure information, and how to interact with information through basic visualization methods.

**OBJECTIVES:**

The course objectives for student learning outcomes include:

- Interdisciplinary perspective on data, information and knowledge
- Understanding of representation limits of information for machine processing
- Introduction to processing techniques to discover novel informative patterns
- Overview of types of information visualization

**PREREQUISITES:**

- Graduate Standing
- Recommended Prerequisite: AIT 524 or permission of department

**INSTRUCTOR:**

Hemant Purohit, Ph.D. (<http://ist.gmu.edu/~hpurohit>)

Department of Information Sciences & Technology, hpurohit\_a\_t\_gmu\_d\_o\_t\_edu

**GRADING:**

Honor Code Policy: <https://oai.gmu.edu/mason-honor-code/full-honor-code-document/>

Weight of grade components are:

Mid-term: 20%, Final-term: 25%, Individual Class Project: 25%, Assignments: 15%, Class Participation: 15%

Grading scale for numerical scores is:

Letter Grade	Numerical Range
A+	97-100
A	93-96
A-	90-92
B+	87-89
B	83-86
B-	80-82

Letter Grade	Numerical Range
C	70-79
F	0 – 69

**REQUIRED READINGS AND REFERENCES:**

Following books are required, in addition to relevant online tutorials, articles, and tool references:

- B1. Davis, C. H., & Shaw, D. (2011). *Introduction to Information Science and Technology*. ASIS&T Monograph Series. Medford, NJ: PB–Information Today. ISBN-13: 978-1573874236, ISBN-10: 157387423X
- B2. Han, J., Kamber, M., and Pei, J. *Data mining: concepts and techniques, Third Edition (The Morgan Kaufmann Series in Data Management Systems)*. ISBN-13: 978-9380931913, ISBN-10: 9380931913

**COURSE OUTLINE:**

Tentative semester plan for topics to be covered:

Week	Contents	Book (Bx), Chapter (ch-y)
1	What is Information: Historical Multidisciplinary Perspective	B1, ch-1
2	Information Representation, and DIKW paradigm	B1, ch-2
3	Information Representation: Multimodality	B1, ch-4
4	Information Theory and Epistemology	B1, ch-14
5	Information Processing Theory: Psychological Perspective and Human Interaction	B1, ch-8 & 9
6	Processing Information: Types of Data Mining Systems	B1, ch-7; B2, ch-1
7	<b>Mid-Term</b>	
8	<b>SPRING BREAK</b>	
9	Processing Information: Structured Representation and Data Preprocessing	B1, ch-7; B2, ch-3
10	Processing Information: Methods for Mining Informative Patterns and Correlations (part 1)	B2, ch-6
11	Processing Information: Methods for Mining Informative Patterns and Correlations (part 2)	B1, ch-5; B2, ch-6
12	Processing Information: Introduction to Clustering Methods	B1, ch-5; B2, ch-10
13	Info Viz: Data Types, Dimensions, and Quality Operators	B1, ch-8
14	Info Viz: Trees and Networks, Dynamic Queries, and Interactive Analysis	B1, ch-9; B2, ch-2
15	Visual Analytical Tools and Information Exploration	Web References
16	Revision and Project Review	
17	<b>Final-Term</b>	