



NEW YORK UNIVERSITY

Stern Business School Masters in Accounting Program

Syllabus: Information Systems and Data Management

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Course description:

As companies aim to be more competitive, the need to have more efficient systems to support the decision-making process becomes a critical component of their business strategy. Generally, large organizations have a vast and complex landscape of systems. More often than expected, such companies have multiple and silo-based business systems to support their operations, finance, accounting, and analytical business processes. As the amount of systems in an organization's landscape increases, the complexity for managing the underlying data becomes even more complicated. From a finance and accounting processes perspective, companies still manage multiple and disconnected systems making basic financial and accounting reporting and controls time consuming and prone to errors.

Without a comprehensive and well defined enterprise data management strategy, companies will end up with delayed and inaccurate data to support decision-making processes. As such, they are unable to satisfy and stay ahead of the ever evolving and increasing client demands, thus reducing their competitiveness. It is then critical that financial professionals understand the data management challenges and best practices for effectively designing global financial and accounting reporting and analytical solutions.

The course provides students with an overview of the key concepts for establishing a comprehensive data management strategy for a large organization, ensuring that its operational and analytical financial and accounting needs are efficiently, effectively, and securely addressed. The course will have an emphasis on real-case scenarios that companies face when addressing global operational and analytical data challenges.

Furthermore, the course will address current trends in managing financial and accounting structured data as organizations move to the Cloud-based computing services.

Class Outline:

The class will cover the following subjects:

1. Key concepts
 - a. Structured vs unstructured data
 - b. Master data vs transactional data
 - c. Systems of Record vs. Systems of Reference
 - d. Data Life Cycle
 - e. Data hierarchies
 - f. On Premise/Cloud computing
 - g. Foundational Financial and Accounting Information Systems (i.e GL, AR, AP)
 - h. Financial closing process data challenges and needs
 - i. Controls over financial reporting and data needs
2. Data modeling for financial systems
 - a. Database modeling, Entity Relation models, Data Normalization
 - b. Managing Financial data structures (Cost Center, Profit Center, Consolidation entities, Legal Entities, Budget, Fiscal/Calendar periods, Chart of accounts).
 - c. Data modeling considerations when dealing with multiple financial systems
3. Data manipulation Languages
 - d. Relational Algebra
 - e. Structured Query Language
4. Data Warehousing
 - a. Enterprise data model
 - b. Data Warehouse architecture
 - c. Reporting applied to finance/accounting
 - d. Managing multi-currencies
 - e. Budget vs actual reporting
5. Data Governance & Master Data Management for Finance and Accounting
 - a. Data Governance processes to support finance and accounting reporting processes
 - b. Data Stewardship
 - c. Analytical & Operational Master Data Management
 - d. Managing data hierarchies
 - e. MDM Use Cases by data domain: Client, Chart of accounts, Organization, Location,
 - f. Financial and Accounting data services
6. Data Quality

- a. Data Quality Dimensions: i.e. Uniqueness, Consistency, Precision, Timeliness, Integrity, completeness
- b. Maturity Model
- c. Best Practices to ensure data consistency across financial and accounting processes
- d. Data quality and financial controls
- 7. Data Security and controls
 - a. Sarbanes Oxley Change Management controls
 - b. Data Security Framework
 - c. Managing PII Data
 - d. Managing Data Encryption in a global and complex systems landscape
 - e. Secure Software Development Lifecycle
- 8. Data Architecture
 - a. Global reporting applications – Managing financial data challenges
 - Global Vendor Spend Analysis
 - Global Tax reporting processes (Legal view vs finance view of the data)
 - Financial consolidation
 - b. How to ensure financial data Change Management: Data Architecture Review Processes
 - c. Best practices
 - d. Data as a Service – Data Access on Demand
 - e. Data Integration

Class Format:

The course will be a discussion-based lecture - reference readings will be required to prepare for each subject. There will also be an assigned group project (3-4 team members) aimed at applying the discussed topics.

Grading

Individual Assignments	20%
Class Participation	5%
Group Project	25%
Mid Term Exam	20%



Individual assignments

Students will be required to prepare three to four assignments. These will be individual assignments - not to be developed in groups. Answers are not to be shared among students. Assignments will be collected at the beginning of class.

Assignments:

Problem Set 1:

Develop a data model to support a customer billing process.

Due Date: TBD

Problem Set 2:

Develop a service request data model to support a customer ordering system. Model service order data model to control revenue and costs by service order

Due Date: TBD

Case 1:

IT Governance at Oxford Industries: Information Architecture for Financial Data, Michael Wybo, Carmen Bernier, International Journal of Case Studies in Management

Evaluate the complexities and challenges for efficiently and timely managing financial closing process in a global and decentralized environment. Identify the challenges companies are facing when managing multiple financial and accounting systems using disparate business processes. Identify control challenges.

Assignment

- Evaluate key IT Governance decisions based on the Weill & Ross framework
- Identification of data challenges
- Develop examples of non-standard and standard data elements (Structured vs unstructured)
- Identify data and processes needed to meet the requirements for financial management and reporting

Due Date: TBD

Case 2:

Canadian Tire: Business Intelligence in 2008, Harvard Business Review, Nicole R.D. Haggerty; Ken Mark

- Overview of the situation, role of BI?
- Key Challenges
- Evaluate BI Strategy
- Evaluate “As Is” and “To Be” DWH architecture supporting the financial reporting processes
- Develop a proposed Going Forward BI Strategy for supporting financial reporting needs. Make the necessary assumptions to support your strategy. Use any applicable frameworks discussed during class.

Due Date: TBD

Group case:

Objective: Develop a comprehensive data management strategy for supporting the financial reporting processes for a company that you are familiar with. Make sure that you have access to enough information to be able to develop a detailed plan.

Questions to be addressed:

What are the data management related challenges? The challenges can be identified as part of the following areas: financial month end closing, quarter end closing, year end closing, Financial/accounting process and data controls, Global Reporting Analytics, Data Governance, Financial Master Data Management, Financial Data Quality, Financial Data Security, Managing PII Data, Data Integration.

Based on the class reviews, how would you address each of the challenges? What are the options for each challenge? Evaluate pros/cons or use a SWOT analysis when applicable.

A suggested document structure should contain at least the following elements

- Executive Summary with recommendations
- Company overview
- Current State “As Is” Data management Challenges
- Strategic Recommendation
 - Vision
 - Strategy
 - Objectives based on priorities
 - To Be architecture

- Recommended Implementation roadmap
- Expected benefits

There is no right or wrong answer. Make sure your analysis is properly supported with the appropriate assumptions.

Format: The final document (excluding exhibits, appendices and references) should not exceed 20 double-spaced typed pages with normal margins.

References. Make sure that all sources of data are clearly referenced/identified at the bottom of each page.

The final report will be collected at the beginning of class on December 1st.

Additionally, each group is to prepare a 10 minute presentation that will take place on December 6th.

Required Reading:

- Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt
- Master Data Management in Practice, Dalton Cervo, Mark Allen, Wiley Corporate F&A
- Managing Data in Motion: Data Integration Best Practice Techniques and Technologies, by April Reeve, Morgan Kaufmann Publishers © 2013 Citation
- For additional required reading materials, see detailed class outline

Detailed Class Outline

Class 1 & 2

Objective:

- Introduction & Class Overview
- Why focusing on Data Management and Analytics?
- Where does Data Management fit within the IT Governance/Strategy?
- SDLC & Data lifecycle
- Data management roles
- Structured/unstructured data
- Master/Transactional data
- Systems of Record/Systems of Reference

- Foundational Financial and Accounting Information Systems (General Ledger, Accounts Receivable, Accounts Payable, Budgeting, Inventory management, Human Resources, Payroll)
- Financial closing process data challenges and needs
- Key financial and accounting data Elements
- Controls over financial reporting and data needs
- On Premise/Cloud Computing

Reference reading

- (Required) Five Key IT Decisions, Making IT a Strategic Asset. IT Governance: How Top Performers Manage IT Decision Rights for Superior Results, Peter Weill, Jeanne W Ross, Harvard, Business Press, 2004
- (Required) The Information Artifact in IT Governance: Toward a Theory of Information Governance, Journal Of Management Information Systems, 2013-14, Paul P. Tallon, Ronald V. Ramirez and James E. Short
- (Required) Gartner's Enterprise Information Management Maturity Model Published: 2 March 2016, Gartner, Analyst(s): Douglas Laney
- (Optional) Prepare to Be an Information Leader Published: 9 May 2012, Gartner, Analyst(s): Debra Logan, Mark Raskino
- (Required) CEO Survey 2012: The One Piece of Information the CEO Needs, 21 March 2012, Gartner: Ken McGee
- (Required) Staffing the Office of the CDO Published: 8 January 2016, Gartner, Analyst(s): Mario Faria, Debra Logan
- (Optional) A Good Information Management Strategy Starts With Vision and Values Refreshed: 13 January 2015 | Published: 19 August 2013, Gartner, Frank Buytendijk, Saul Judah
- (Required) Strategic Road Map for Enterprise Information Management, 17 March 2015, Gartner, Analyst(s): Andrew White
- (Required) Barclays fined \$3.75m after record-keeping failure, <http://www.bbc.com/news/business-25525621>
- (Required) Predicts 2016: Cloud Computing to Drive Digital Business Published: 8 December 2015, Gartner, Analyst(s): David Mitchell Smith, Ed Anderson, Yoram V. Natis, Jay Heiser, Thomas J. Bittman, Douglas Toombs, David W. Cearley, Jeffrey Mann, Neville Cannon, Gregor Pet

Class 3& 4

Objectives:

- What is a data model?
- Data models in the context of Enterprise Architecture
- Role of the Database modeler
- Characteristic of a good data model
- Type of Data models (Relational, Hierarchical), Notations
- Entities, Relationships, attributes
- Entity-Relationship Diagrams
- Managing Financial and Accounting data structures (Cost Center, Profit Center, Consolidation entities, Legal Entities, Budget, Fiscal/Calendar periods, Chart of accounts).
- Data modeling considerations when dealing with multiple financial and Accounting information systems
- One to one, one to many, many to one, many to many relationships
- Normalization (first, second and third normal form)
- Primary keys - challenges in determine primary keys
- Referential Integrity
- Data modeling for finance and accounting projects

Required Reading

- (Required) Chapter 1,2, 3, Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt
- (Required) Chapter 5,6,8 Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt
- (Optional) Chapter 1,2, The data Model Resource Book - Rev Edition, Vol1, Len Silverston
- (Required) Enterprise Data Modeling: Lost Art or Essential Science, Business Intelligence Journal, Students Edition 2015, Larissa Moss

Class 5 & 6

Objectives

- Recursive relationships
- Logical, Physical models
- Review Examples of Data models (Customers, Vendors, GL accounts, Financial and Accounting structure, Location)
- Review hierarchical relationships (Client data)
- Review Time dependent entities and relationships

Reference Reading

- (Required) Chapter 1,2, 3, Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt
- (Required) Chapter 5,6,8 Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt

Class 7Objectives**Lecture Speaker Visit**Reference Reading

- (Required) Chapter 10, Master Data Management in Practice, Dalton Cervo, Mark Allen, Wiley Corporate F&A

Class 8Objectives

- Review Real case - Hierarchical relationships (Client data) for financial and accounting reporting
 - Balanced/Unbalanced hierarchies
- Managing Global and Local view of Client data for financial and accounting reporting

Reference Reading

- None

Class 9-11Objectives

- Data manipulation Languages
- Relational Algebra applied to finance/accounting data examples
- Structured Query Language applied to finance/accounting data examples
- Creating a Data Warehouse

- DWH Architecture
- Enterprise Data Model
- Time dependency in a Sales data model
- DWH – Challenges
- Reporting applied to finance/accounting
- Managing multicurrencies
- Budget vs actual reporting
- Aggregating Data
 - Global vs local chart of accounts
 - Financial organization rollup
 - Year to Date facts
 - Multiple fiscal accounting period
- Implementing a financial DataMart
 - MTD, QTD, YTD views
 - P&L view
 - Revenue by client view
 - AR, AP views
- Operationalizing a DWH
 - Data differences and reconciliation processes
 - Data control and access issues

Reference Reading

- (Optional) The DataWarehouse toolkit, Third Edition, Ralph Kimball, Margy Ross, Chapter 7
- (Required) The Data Warehouse, Chapter 2, Business Intelligence: Making Decisions through Data Analytics, Jerzy Surma, Harvard Business Publishing, 2011
- (Required) Chapter 15, 16,17, Data Modeling Essentials, Third Edition, by Graeme C. Simsion and Graham C. Witt
- (Optional) Chapters 16-17, Managing Data in Motion: Data Integration Best Practice Techniques and Technologies, by April Reeve, Morgan Kaufmann Publishers © 2013 Citation

Class 12-13

Objectives

- Review Master Data Management strategy and its applicability to support finance/accounting processes
- MDM maturity model
- MDM roadmap
- Business Case
- Data Ownership
- MDM Style
- Analytical & Operational MDM
- Data Governance processes to support finance reporting processes
- Data Stewardship processes to support finance reporting processes

Reference Reading

- (Required) Chapter 1,2,3 Master Data Management in Practice, Dalton Cervo, Mark Allen, Wiley Corporate F&A
- (Required) A day in the Life of an Information Steward Published: 30 November 2015, Gartner, Analyst(s): Andrew White
- (Required) Management of the Master Data Lifecycle: A Framework for Analysis, Journal of Enterprise Information Management, March 2012, Martin Hubner Ofner, Kevin Straub, Boris Otto and Hubert Oesterle
- (Optional) Towards advanced reference data management at transaction banks: creating a centralized view, Journal of Payments Strategy and Systems Vol 9 Number 1, Carlo R.W. de Meijer, Susan Hall and Sofia Simenidou, Nov 2014
- (Required) Chapter 4,5, Master Data Management in Practice, Dalton Cervo, Mark Allen, Wiley Corporate F&A
- (Required) The Seven Building Blocks of MDM: A Framework for Success, Andrew White | Bill O'Kane, 2012, Gartner
- (Required) Where to Get Started with Master Data Management, Andrew White, 2014, Gartner
- (Optional) Magic Quadrant for Master Data Management of Customer Data Solutions, Bill O'Kane, Saul Judah, Nov 2015

Class 14

Objectives

- MDM Use Cases by data domain: Client, Vendor, Organization, Location, Chart of accounts
- Multidomain MDM
- Challenges

Reference Reading

- (Required) MD3M: The Master Data Management maturity model, Computers in Human Behavior, 2014, Elsevier Ltd, Marcos Spruit, Katharina Pietzka
- (Required) How to Design the Master Data Architecture: Findings from a case study at Bosch, International Journal of Information Management, Dec 2011, Boris Otto

Class 15

Objectives

- **Visiting Executive from one of the Big Four Accounting Firms - TBD**
 - **Perspective on effectively managing data to support global accounting processes.**
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Class 16-17

Objectives

- Data Quality
- DQ dimensions/Examples
- Metrics
- Best Practices to ensure data consistency across financial/accounting processes
- Challenges when managing financial/accounting processes' data

Reference Reading

- (Required) The Chief Information Officer and the Chief Data Officer Complement Each Other, 24 March 2015, Analyst(s): Debra Logan | Joe Bugajski
- (Required) "Twelve Ways to Improve your Data Quality, Dec 2015 G00279288, Gartner, Saul Judah, Ted Friedman

- (Required) Chapter 6,8, Master Data Management in Practice, Dalton Cervo, Mark Allen, Wiley Corporate F&A"
- (Required) A Critical Success Factor Framework for Information Quality Management, Information Systems Management, Sept 2014, Sasa Baskarada & Andy Koronios
- (Optional) Implementing an Enterprise Data Quality Strategy, Business Intelligence Journal, Vol 18, Number 4, Nancy Couture
- (Required) Barriers to Master Data Quality, Journal of Enterprise Information Management, 2011, Anders Haug and Jan Stentoft Arlbjørn
- (Required) The State of Data Quality: Current Practices and Evolving Trends, March 2016, Gartner, Saul Judah, Ted Friedman

Class 18

Midterm Exam

Class 19

Objectives

- Sarbanes Oxley Change Management controls
- Data Security Framework
- Managing PII Data
- Data Classification
- Managing Data Encryption in a global and complex systems landscape
- SSDLC Secure Software Development Lifecycle

Reference Reading

- (Required) Information Risk, Security and Compliance Are Top Priorities for Chief Data Officers in 2016 Published: 14 January 2016 Analyst(s): Andrew White
- (Required) Hype Cycle for Data Security, 2015, Gartner, Brian Lowans
- (Required) Application and Data Security Primer for 2016, January 2016, Gartner, Brian Lowans, John Girard, Ayal Tirosh, Lawrence Orans

Class 20

Objectives

- **Visiting Technology Executive – BI & MDM - TBD**

Class 21

Objectives

- Data Integration Strategy
- EAI / ETL
- Examples of complex Systems integration landscapes
- ESB
- Monitoring
- Data as a Service – Data Access on Demand (i.e. REST APIs)
- API Management

Reference Reading

- (Required) Chapters 1-6, 10-13 Managing Data in Motion: Data Integration Best Practice Techniques and Technologies, by April Reeve, Morgan Kaufmann Publishers © 2013 Citation

Class 22

Objectives

- **Review a real case scenario**
- **Visiting Technology Executive - TBD**

Class 23

Objectives

- Data Architecture
- Global data warehouse architecture and Global reporting applications – Managing financial and accounting data challenges effectively

Reference Reading

- (Required) Build the Foundation One Project at a Time. Implementing an IT Architecture. Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, Jeanne W Ross, Peter Weill, David C Robertson, Harvard Business Review, 2006
- (Optional) Moving to a Modern Data Architecture, Best Practices Series, Joe McKendrick, Database Trends and Applications , Information Today Inc.

Class 24

Objectives

- **Review a real case scenario**
- **Visiting Technology Executive - TBD**

Reference Reading

None

Class 25

Objectives

- What is next?

Reference Reading

- (Required) Defining the Data Lake, May 2015, Gartner, Nick Heudecker, Mark A. Beyer, Lakshmi Randall
- (Optional) Top 10 Strategic Technology Trends for 2016, February 2016, Gartner, David W. Cearley, Brian Burke, Mike J. Walker
- (Required) 2016 Strategic Roadmap for Modernizing Your Data Warehouse Initiatives, October 2015, Gartner, Lakshmi Randall, Mark A. Beyer
- (Required) Is the Data Lake the Future of the EDW? Published: 10 November 2015 Analyst(s): Roxane Edjlali, Mark A. Beyer
- (Optional) Magic Quadrant for Data Warehouse and Data Management Solutions for Analytics: 12 February 2015, Gartner, Mark A. Beyer, Roxane Edjlali
- (Required) Chapters 19-21, Managing Data in Motion: Data Integration Best Practice Techniques and Technologies, by April Reeve, Morgan Kaufmann Publishers © 2013 Citation

Class 26



Objectives

- Case Presentations

Class 27

- Final Exam