

---

---

THE GEORGE  
WASHINGTON  
UNIVERSITY

---

---

WASHINGTON D C

DEPARTMENT OF INFORMATION SYSTEMS AND TECHNOLOGY MANAGEMENT

**Spring 2007, Tuesdays 6 - 8 PM, VA Campus Building 1 #129**

- Course Number:** Information Systems and Technology Management 284
- Course Title:** Database Systems
- Course Description:** Use of latest techniques for developing and implementing an effective database system. Topics include database organization, creation, and maintenance; evaluation criteria; standardization of database systems; and analysis of the state of the art in database development.
- Prerequisites:** MSIST candidacy or department approval.
- Professor:** Sergey Ivanov, Ph.D.
- Contact:** 1-703-726-8314 office  
1-202-302-4282 wireless  
1-703-726-8311 fax  
[sergey@gwu.edu](mailto:sergey@gwu.edu)  
[sergeygw@gmail.com](mailto:sergeygw@gmail.com) (Instant Messenger)  
<http://home.gwu.edu/~sergey>
- Office Hours:** Tuesdays before/after class, and by appointment (including weekends).
- Text Required:** “Beginning Database Design” ISBN 0764574906, Powell  
“Database Management Systems,” Gorman (provided in class for free)
- Text Recommended:** “An Introduction to Database Systems” ISBN: 0321197844, Date  
“Database Design for Mere Mortals” ISBN: 0201752840, Hernandez<sup>1</sup>
- Course Objective:** This course is designed to provide a theoretical foundation and hands-on experience developing a database application. It gives the student experience in implementing a database solution and introduces the student to major commercial DBMS products used in systems development.
- Instruction Method:** Lectures/Discussions, Labs & Projects.
- Assignments:** Homework 1, 2 & 3, Team Project, DBMS Technology Paper.

---

<sup>1</sup> This book is available on <http://books.google.com>.

## DBMS Technology Paper

Each student should download, test and research in depth a DBMS product not covered in class (for example: Adabas, FoxPro, Mimer, DataEase, Borland InterBase, etc.), compare it with topics covered in class, and succinctly present the report (5-minute in class presentation). You must download the software from a vendor's web site, and test it out, create tables, other database structures, read technical literature on this product, and produce a meaningful report (single-spaced, 2 pages maximum) to share with other students in class.

Each topic must be approved in advance to ensure that everyone researches a different DBMS. The paper should be in-depth technical (not marketing); present information in a most useful and beneficial way to the reader, references including; plagiarism will not be tolerated. You will present the topic briefly in class on April 17.<sup>2</sup>

Topic Selection Due: March 6, 2007 (absolute<sup>3</sup> deadline) – before class starts.  
DBMS Paper Due: April 17, 2007 (absolute deadline) – before class starts.

## Team Project

The class is divided into teams of three to four students to implement a hypothetical project chosen in class. Each team will present a developed ERD as a solution to the problem on February 27, and a final ERD and user interface on May 1, when the team project is due.

The final report should be a brief document consisting of succinct problem description, enumerated requirements with an explanation which tables enforce each specific requirement and how, logical ERD, physical-level ERD with all indexes clearly marked and explained, implemented back-end and front-end (HTML DB or other technology).

Each team is encouraged to use iterative development approach, and submit all parts of the project, especially the ERD, to the instructor regularly for a review; instructor's experience suggests that usually three to four versions of ERD would be required. *Furthermore, the instructor suggests meeting when the team encounters difficulties and/or has questions.*

## Collaboration

Students are encouraged to work with each other to discuss and solve problems. A well-known management professor and author Dr. Jerry B. Harvey believes that not helping others when they request help constitutes cheating,<sup>4</sup> and thus, please collaborate and help each other.

---

<sup>2</sup> Please note that I will not accept papers longer than two pages and any not approved topics.

<sup>3</sup> The absolute deadline means that no submissions will be accepted after the deadline for any reason.

<sup>4</sup> Harvey, Jerry B. (1984). Encouraging Students to Cheat: One Thought on the Difference between Teaching Ethics and Teaching Ethically. Journal of the Organizational Behavior Teaching Society, 9(2), 1-13.

## Available Computer Labs & Computing Resources

- 1) MDC Classroom (#323), Technology Classroom (#129), Project Lab (#322).
- 2) Virtual Lab: use Windows *Remote Desktop Connection* to connect to [islabs.msist.gwu.edu](http://islabs.msist.gwu.edu)

### *Instructions:*

To use Remote Desktop Connection, use Windows Update to install latest version of Remote Desktop Connection from Microsoft (one of the optional components).

Click on Start, Programs, Accessories, Remote Desktop Connection  
Connect to: [islabs.msist.gwu.edu](http://islabs.msist.gwu.edu)

If you have a high-bandwidth connection, click on Options, and you may change the settings to 10mbps, map local drives, use high-resolution, etc.

When done, please click Logoff, and also e-mail all documents to yourself, because this is a public server for our students.

- 3) Additionally, the instructor will provide each student with software for home use and enable connection to all servers via the Internet.
- 4) To obtain free Microsoft software, visit: <http://labs.msist.gwu.edu/msdnaa>.
- 5) To obtain additional<sup>5</sup> (and free) Oracle software, visit: <http://otn.oracle.com>.

### Grading Method

Homework	1	20%
	2	5%
	3	5%
DBMS Technology Paper and Presentation		10%
Team Project		30%
Final Exam		30%
<hr/>		
TOTAL:		100%

Grade:	Points:
A	100 – 91
A-	90 – 89
B+	88 – 87
B	86 – 81
B-	80 – 79
C+	78 – 77
C	76 – 71
C-	70 – 69
F	68 and below

<sup>5</sup> The Oracle 10g client is given in class on a CD and Oracle access is available via any web browser.

DATE <sup>6</sup> , SESSION	PROJECT DUE <sup>7</sup>	LAB <sup>8</sup>	THEME	READING <sup>9</sup>
January 16, #1	<i>Open free accounts:</i> <a href="http://technet.oracle.com">http://technet.oracle.com</a> <a href="http://oai.oracle.com">http://oai.oracle.com</a>  Team Information		Class Introduction, Team Forming, Choosing Team Project	
January 23, #2	<i>Read:</i> “Data is Executed Policy” “Iterations of Database Design”		Introduction to Database Theory: Requirements Analysis, Data, DBMS, Paradigms (Flat-file, Network, Relational, OO), Embedded Databases	Ch 1, 2  <i>Gorman 1</i>
January 30, #3	<i>Read:</i> “A Relational Model of Data for Large Shared Data Banks”		The Relational Database Model: Anomalies, Normalization, Normal Forms	Ch 3, 4  <i>Gorman 2</i>
February 6, #4			The Relational Database Model: Referential Integrity, Cardinality, Data Modeling, Entities and Attributes	Ch 5  <i>Gorman 3</i>
February 13, #5	Homework 1: ERD	1	E/R Modeling, Forward- and Reverse-engineering, CASE tools	
February 13, #6		2	ERwin, Scripts, Oracle, SQL Server, HTML DB	
<i>February 20, –</i>	<i>OFF – no class; the instructor is out of town on ANSI H2 Database Committee in San Diego, CA</i>			
February 27, #7	Team ERD Presentations			
March 6, #8	DBMS Paper Topic Selection	3	Indexing	Ch 8 <i>Gorman 4</i>
<i>March 13, -</i>	<i>Spring Break – have fun!</i>			
March 20, #9			SQL: Guest Speaker – an author of SQL language, Michael Gorman	
March 27, #10		4	Indexing cont., storage, connectivity	Ch 13 <i>Gorman 5</i>
April 3, #11	Homework 2	5	Locking, Concurrency Controls	<i>Gorman 6</i>
April 10, #12			Oracle Trip	
April 17, #13	DBMS Paper & Present		Course Review	
April 24, #14			Final Exam	
May 1, #15	Team Project, Homework 3		Team Presentations	

**Additional Readings:** <http://home.gwu.edu/~sergey>  
<http://www.wiscorp.com>  
<http://otn.oracle.com>

<sup>6</sup> Dates and topics on the syllabus may change slightly to accommodate the class’ needs.

<sup>7</sup> All projects due must be submitted promptly in the beginning of each class, or they will be subject to penalty of one point per day late.

<sup>8</sup> Each lab is designed as an in-class hands-on exercise.

<sup>9</sup> All assigned reading is due before class; for a complete required reading list, please check the class’ web page at <http://home.gwu.edu/~sergey>.

## Homework Assignments

### Goal

This assignment is designed to give each student an individual hands-on experience implementing a database application, which will be closely duplicated in a team effort.

### Problem Description<sup>10</sup>

Imagine, you have been appointed a captain/coach for an ultimate frisbee (or soccer, etc.) team, and you desperately need to manage all team-related activities. Each team is coed and consists of 25 or so players. The sports federation collects team fees for fall, spring, summer and winter leagues, which usually range in \$300 per team per season. Usually you pay this fee to the federation, and then each player reimburses you; thus, you need to ensure each team-member pays a proper fee each season (by cash, PayPal, or check) to you. Additionally, each season the federation requires an official team roster consisting of players' names, gender, addresses, phones, e-mail, dates of birth, and emergency contacts. Furthermore, sometimes you need to order team uniforms (shirts) for the whole team, and need to keep track of players' shirt-sizes and numbers, as well as fees collected so you would know who paid and who owes you money.

You are an active team coach, and you hold lots of practices and scrimmages with other teams. You would like to record and create a master schedule for your team, and also take RSVPs from each team member to know how many people and who to expect at each practice, game or tournament. You also need to ensure that no one double-registers, and that accidentally no practice or game is scheduled at the same date and time in different locations. You also would like to keep various outdoor field information as well as directions to and address of the fields, as well as keeping a record what is taught at each practice. Occasionally, your team travels to tournaments, held at different cities, and so you need to keep a roster for each tournament, fees collected from players, and fee paid to tournament organizers.

### Homework 1

Design an ERD solution to the problem. The ERD could be implemented by hand or via a data-modeling tool, and can be re-submitted as many times the student wishes within the normal course of the semester (by May 1), using an iterative approach to database development. *Note: normally it takes the instructor one week to review each ERD; so, prompt revisions in the beginning of the semester are encouraged. Furthermore, the instructor suggests meeting when the student encounters difficulties with this or any other assignment(s).*

### Homework 2

Design a physical-level ERD, properly identify all relationships, PKs, FKs, datatypes, fields' sizes, highlight all indexes, and list every table and indexes for each table, with one/two-purpose-sentence succinctly explaining why you need this index.

### Homework 3

Implement a physical-level ERD in the Oracle DBMS including all indexes and create a basic-level working user interface using Oracle's HTML DB or any other technology.

*For extra credit, optionally, each student is encouraged to implement the project in MS Access (both, back- and front-end), and/or SQL Server/.Net architectures.*

---

<sup>10</sup> One of our alumni, who works in Washington DC, phoned me and offered an unpaid internship(s) for a student(s) to design a database for his organization. Some of the projects include an assets management system, project management, and others. Any interested student(s) wanting to do an internship is welcome to substitute this homework problem for the one offered; please contact the instructor for approval and contact information.

**ISTM 284 SPRING 2007, TEAM EVALUATION FORM, DUE MAY 1, 2007**

\_\_\_\_\_  
Student's First Name

\_\_\_\_\_  
Student's Last Name

\_\_\_\_\_  
Team Name

*Please evaluate everyone (and include yourself in the evaluation) on a scale of 100% effectiveness/effort/contribution & sign below (use the back side if needed):*

	<b>TEAM MEMBER</b>	<b>EFFECTIVENESS (0-100%)</b>	<b>PLEASE STATE <u>EXACTLY</u> WHAT THE TEAM MEMBER DID AND ACCOMPLISHED:</b>
1			
2			
3			
4			

**SIGNATURE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**THIS EVALUATION FORM MUST BE SIGNED TO BE ACCEPTED. IT MAY BE FAXED TO 703-726-8311.**