ERP 6220 Data Modeling & Visualization Prototyping for Enterprise Decision Dashboards
Course Syllabus – Spring 2022

Department of Business & Information Technology Mission

"To serve the economic interests of industry and the evolving needs of society in a challenging, rapidly-changing, global environment, the Department of Business & Information Technology capitalizes on the strong technological emphasis of Missouri S & T to enable individuals to excel in a technology-centric business world. Recognizing this rapid evolution of the marketplace, we create and disseminate knowledge impacting the theory and practice of business."

INSTRUCTOR AND COURSE INFORMATION

Instructor: Bih-Ru Lea, Ph.D.
Office: Fulton 102A
Phone: 573-341-6436
E-Mail: leabi@mst.edu

Course Credit: 3 semester hours of credit
Prerequisite: ERP 5110 and one of (ERP/IST 6444 or ERP5410)

Class Hours: 9:30 – 10:45 am, Tu & Th
Classroom: Fulton 107A
Office Hours: 11:30 am – 1 pm Tu & Th
And by appointment
Class Web: http://canvas.mst.edu

COURSE CATALOG DESCRIPTION:

Study integration of data modeling, data warehouse, and visualization prototyping in the design and implementation of enterprise decision dashboards for descriptive, predictive, and prescriptive analytics. Assignments and project implementations use SAP HANA Studio, SAP Analytics Cloud, Design Studio/Eclipse IDE, and SAS Viya.

COURSE OBJECTIVES

Strategic Enterprise Management involves analyzing how effectively a company is attaining its strategic objectives as well as developing effective decision support and reporting system. The main objectives of this course are to stimulate the student's problem-solving abilities and critical thinking skills and to improve student's communication skills. As a result of taking this course, students are expected to be able to demonstrate:

Course Objectives	**Program Learning Objectives**					
	Communication Skills	Critical Thinking	Information Technology	Teamwork & Leadership	Global & Multicultural Issues	Integrate Business Areas
• an understanding of competitive strategies from leveraging the information technology			X		X	
• an understanding of roles, applications, and impact of decision dashboards on enterprise mobile strategies and Big Data Analytics	X	X	X			
• an understanding of principles of Visual Design and Design Thinking in decision dashboard design and implementation	X	X	X			
• an understanding and be able to communicate fundamental concepts of business analytics, data visualization, decision dashboards, and data warehouse	X	X	X			
• abilities to design and implement an effective analytical dashboard to support decision making in both on-premises and enterprise cloud environments		X	X	X		
• abilities to design and implement an effective data warehouse to support business analytics, visualization, and performance management	X	X	X	X		X

TEXTBOOK(S) AND MATERIALS FOR COURSE

- Information Dashboard Design: Displaying Data for At-A-Glance Monitoring (ISBN-10: 1938377001, ISBN-13: 978-1938377006), 2nd ed., by Stephen Few, Analytics Press; 2013
- ERP6220 Course Packs ((ISBN:), Missouri S&T Bookstore (https://www.thesandtstore.com/)

GRADING POLICIES AND PROCEDURES:

Test 1 (concept & Computer Operations)	140 pts	Tean Semester Project	120 pts
Test 2 (concept & Computer Operations)	140 pts	• Milstone 1 (20 points)	
Assignments (labs, exercises, & quizzes)	540 pts	• Milestone 2 (20 points)	
Team Chapter Presentation	60 pts	• Presentation & Prototype demo (80 pts)	

Grading Scale:

A: ≥ 895 pts B: 795 – 894 pts C: 695 – 794 pts D: 595 – 694 pts F: < 594 pts

General Grading Policies:

1. **ALL ASSIGNMENTS AND TESTS ARE INDIVIDUAL WORKS UNLESS OTHERWISE SPECIFIED.**
2. Please make every effort to make it to class on time. It is disruptive to the class to have members arriving late.
3. The instructor will assign NO incompletes in lieu of a regular grade.

Assignments:

1. The assignment must be submitted at the beginning of the class period on the assigned date due. All homework assignments are due at the beginning of the class on its due date. The grade will be reduced by 15% if the assignment is turned in within 24 hours later than its due time/date. The late penalty is incremented by 15% for every 24 hours late. No work will be accepted if submitted four days after the due date, including weekends. The exception will only be given to a student with a legitimate reason and he/she notifies the instructor **five days before the due date**.
2. If you are unable to attend a class, you need to (1) **submit your assignment file(s) via the Canvas submission link by the due date** and (2) ask a friend to submit a hard copy on your behalf at the beginning of the class on the due date.

Exams and Quizzes

1. The course has two exams: a midterm exam and a final exam. **All exam materials may become the property of the instructor after completion**.
2. It is possible to have announced and pop quizzes throughout the semester. The student will be given the date of announced quizzes one week in advance.
3. Exam dates and quizzes are a part of the class schedule. Failure to appear for an exam/quiz will result in the assignment of a zero for that exam/quiz. If you are going to miss an exam with a legitimate reason (e.g., scheduled surgery, official University business, etc.), contact the instructor **PRIOR** to the administration of that exam/quiz. A make-up quiz/test may be allowed **during the final exam period** only if convincing reasons and proper documentation (such as a doctor's note in case of a surgery/illness) are given for the absence. The make-up exam will be a comprehensive exam covering the material from throughout the course.
4. All in-class quizzes and tests are closed books and closed notes unless otherwise specified.

Class Project:

A team project that involves the design and implementation of a decision dashboard system is required. The project description, requirements, and grading forms are provided in the course pack. Students may **NOT** receive these papers back, so if students want a copy, s/he better keeps one for him/herself. However, students may come to review my comments on the report after they are graded.

Class Attendance and Participation:

1. Attendance is required. You are also responsible for finding out what was covered in class and what announcements were made as well as obtaining handouts.
2. Overall, student participation and discussion are essential to ensure that the course topics are understood and are made relevant to actual business situations encountered in the workplace. As such, attendance and participation are essential factors in the learning process and a tool for assessing student learning. Therefore, you are required and expected to attend all classes.
3. Each 10% of **unexcused absences will result in the loss of a letter grade**. For example, if your grade is a B and you have missed 10% of classes without legitimate excuses, you will end up with a C.
4. The instructor reserves the right to drop a student if a student has missed more than 20% of class time.

Discussion Board Participation

To help students to better understand course materials, to develop debugging skills, and to learn from each other, the instructor has enabled a discussion board in the *Canvas Learning Management System*. **All technical support for assignments, exams, and projects are provided through the Discussion Board** and will **NOT** be answered through e-mail by the instructor.

a. If you do not understand a concept or encounter a problem/error that you do not know how to resolve yourself, you will need to post your questions on the discussion board. You are also expected to answer questions asked by your peers. Occasionally, the instructor will also post questions and answers.
b. Before post a question on the Discussion Board, it is the student's responsibility to check and ensure no same question has been posted previously.
c. Discussion board participation may earn you extra credit points toward your course grade. Straight forward questions (for example – how do I get to this transaction, where can I find this button, etc) will not count. Do not post questions just for the case of posting.

GENERAL COURSE POLICIES:

Statement about Copyright, FERPA, and Use of Video

It is vitally important that our classroom environment promotes the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions whether in class or online. Please speak with me before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without my authorization and the permission of others who are recorded. More information is provided online.

Accessibility and Accommodations

It is the university's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on a disability, please contact Student Disability Services at (573) 341-6655, sdsmst@mst.edu, visit http://dss.mst.edu/ for information.

Student Honor Code and Academic Integrity

- The Honor Code all students are expected to follow can be found at this link: http://stuco.mst.edu/honor-code/.
- Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism and sabotage (http://registrar.mst.edu/academicregs/index.html), **all of which will be reported to the Vice Provost for Academic Support.**
- Additional guidance including the University's Academic Dishonesty Procedures is available at http://academicsupport.mst.edu.
- Other resources for students regarding ethics and integrity can be found at http://academicsupport.mst.edu/academicintegrity/studentresources-ai.

Well-Being and UCARE (https://go.mst.edu/ucare-report)

Any of us may experience strained relationships, increased anxiety, feeling down, alcohol/drug misuse, decreased motivation, challenges with housing and food insecurity, etc. When your mental well-being is negatively impacted, you may struggle academically and personally. If you feel overwhelmed or need support, please make use of S&T's confidential mental health services at no charge. For a quick guide to campus resources that address specific issues please visit our Well-Being Referral Guide, available as a website at https://minerwellness.mst.edu/well-being-referral-guide/. If you are concerned about a friend or would like to consult with a Care Manager, please make a UCARE referral for support and assistance. https://stuaff.mst.edu/ucare/.

Nondiscrimination, Equity, and Title IX

Missouri University of Science and Technology is committed to the safety and well-being of all members of its community, and to creating an environment free from discrimination and harassment.

The University does not discriminate on the basis of race, color, national origin, ancestry, religion, sex, pregnancy, sexual orientation, gender identity, gender expression, age, disability, protected veteran status, and any other status protected by applicable state or federal law. As used in this policy, the word "sex" is also inclusive of the term "gender."

Additionally, US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Violations of this law include sexual harassment, sexual assault, dating/domestic violence, and stalking.

In accordance with The Collected Rules and Regulations University of Missouri, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Equity Officer, any notice of discrimination disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T's Equity Officer and Title IX Coordinator is Chief Diversity Officer Neil Outar. Contact him (naoutar@mst.edu; (573) 341-6038; 203 Centennial Hall) to report violations of the university's nondiscrimination policies, including Title IX. To learn more about resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit http://titleix.mst.edu.

Classroom Egress Maps

For all in-person instruction, faculty should explain where the classroom emergency exits are located. Classroom egress maps are posted at http://designconstruction.mst.edu/floorplan/.

Lateness

Normally, the instructor will be in class on time. However, if the instructor is late by more than fifteen minutes, students should check with the Department of Business Administration located in Fulton 101 whether the class will be canceled. Students are expected to be in class on time.

KEY DATES:

- The last day to add this course is Monday, January 31
- The last day to withdraw from this course without a "WD" showing on the transcript is Monday, February 28
- The last day for dropping this course is Friday, April 15

ERP 6220 Required Reading List

Reading 1 (**R1**): Ch. 3 Descriptive Analytics II: Business Intelligence and Data Warehousing, 4/E, by Ramesh Sharda, Dursun Delen, Efraim Turban (ISBN-10: 0134633288, ISBN-13: 9780134633282), 2017

Reading 2 (**R2**): Dimensional Modeling Process and Tasks, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons.

Reading 3 (**R3**): Ch. 17 Kimball DW/BI Lifecycle Overview, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons.

Reading 4 (**R4**): Data Warehouse Design Example 1: Ch. 3 Retail Sales, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons

Reading 5 (**R5**) Data Warehouse Design Example 2: Ch. 6 Order Management, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons

Reading 6 (**R6**): Ch. 5 Data Mining, in *Business Intelligence and Analytics: Systems for Decision Support*, 10th Ed., by Ramesh Sharda, Dursun Delen, Efraim Turban, ISBN-13: 978-0133050905 ISBN-10: 0133050904, 2015, Pearson Publishing.

Reading 7 (**R7**): Ch. 1 Introduction to Anonymizing Health Data, in *Anonymizing Health Data*, 1st Edition, ISBN-13: 9781449363079, by Khaled El Emam; Luk Arbuckle, O'Reilly Media

Reading 8 (**R8**): Ch. 13 De-Identification and Data Quality: A Clinical Data Warehouse, in *Anonymizing Health Data*, 1st Edition, ISBN-13: 9781449363079, by Khaled El Emam; Luk Arbuckle, O'Reilly Media

ERP6220 Fall 2020 Course Schedule

TXT: Textbook **CP:** Course Pack **Reading #:** Chapter Reading provided in the Course Pack

Week	Topics	Textbook	Course Pack
Prior to the 1st class	1. Purchase the textbook and course pack		
	2. Review Class Syllabus (Canvas→ Syllabus)		
	3. Complete course Preparation Tasks & Technology Requirement Testing		426 - 426
	4. Complete Pre-Class Survey (Canvas → Assignments)		
1 1/18, 1/20	Introduction to ERP 4220 and Course Overview		1 - 10
	The Art and Influence of Data Visualization		11 - 17
	Ch. 1. Clarifying the Vision	Ch. 1	18- 32
	Ch. 2 Common Dashboard Design Mistakes	Ch. 2	33 - 39
	Assignment: Dashboards Exercises		
2 1/25, 1/27	Ch. 3 Assessing what's needed?	Ch. 3	40 - 42
	Ch. 4. Fundamental Considerations	Ch. 4	43 - 44
	Hands-on activity: SAS Viya: Visual Analytics (online user manual provided in "Week 2 Documents" folder in the Canvas Module section		450 - 457
	Lab 1 Visualization and Dashboard Design using SAS Viya: Visual Analytics		458 - 479
3 2/1, 2/3	Ch. 5 Tapping into the Power of Visual Perception	Ch. 5	45 - 51
	Hands-on activity: SAS Viya: Visual Analytics: Interaction Objects & Controls		
	Lab 2: Dashboard Interaction Design using SAS Viya (Visual Analytics Report)		480 - 500
	Assign Team Chapter Presentation (present on 2/22, 3/1)		
4 2/8, 2/10	Notes: Visualization and Design Thinking Persona and User Experience Journey Business Process Modeling		60 – 76 69 – 72 73 - 76
	Ch. 6 Achieving Elequnce through Simplicity	Ch. 6	52 – 59
	Hands-on activity: SAP Build Prototyping Tool		501 – 505
	Lab 3: SAP Fiori App Prototyping: Sales App design using SAP Build		506 - 519
5 2/15, 2/17	Reading 1: Ch. 3 Descriptive Analytics II: Business Intelligence and Data Warehousing		77 - 95 139 - 146
	Introduction to In-Memory Databases for Analytic Applications		520 – 543
	Hands-on activity: In-Memory Database Modeling using SAP HANA		544 – 573
6 2/22, 2/24	Reading 1: Ch. 3 Descriptive Analytics II: Business Intelligence and Data Warehousing		95 – 134 146 - 168
	Ch. 7 – Ch.9: Graphs and Display Media	Ch. 7 - 9	
	Lab 4: SAP HANA Data Modeling: Tables		574 – 592
7 3/1, 3/3	Ch. 10 – Ch.12: Graphs and Display Media	Ch. 10-12	
	Reading 2: Ch. 18 Data Warehouse: Dimensional Modeling Process and Tasks		169 – 182 183-188
	Hands-on activity: SAP HANA Data Provisioning- the ETL Process		562 – 573
	Lab 5 SAP HANA Data Modeling: Attribute Views and Analytical Views		593 – 614

Week	Topics	Textbook	Course Pack
8 3/8, 3/10	Reading 2: Ch. 18 Data Warehouse: Dimensional Modeling Process and Tasks		169 – 182 183-188
	Midterm Exam: Concept test on 3/10 Take home computer operations: due at 4 pm on 3/15		
9 3/15, 3/17	*Hands-on activity:* Dashboards and SAP BusinessObjects Design Studio (Eclipse IDE)		615 – 641
	3/17: Spring Recess: No class		
	Lab 6: Decision Dashboard App Development: Design Studio (Eclipse IDE) and SAP BW data source		642 – 657
10 10/28	Reading #3: Ch. 17 Data Warehouse and Business Intelligence Life Cycle		189 - 214 215 – 216
	Team chapter presentation 1: Reading #4: Retail Sales (Data Warehouse Design Examples)		217 – 258
	Team chapter presentation 2:: Order Management (Data Warehouse Design Examples)		259 – 293
	Lab 7: Decision Dashboard App Development: Design Studio (Eclipse IDE) and SAP BW data source		658 - 684
11 3/29, 3/31	Spring break: 3/27 – 4/3, NO CLASSES		
12 4/5 4/7	Reading #6: Ch. 5 Data Mining & Visualization for Descriptive, Predictive, Prescriptive Analytics		293 - 320 351 - 356
	Hands-on activity: SAS Viya: Visual Statistics & Data Mining Cluster Analysis Decision Tree		727-732
13 4/12, 4/14	Reading #6: Ch. 5 Data Mining & Visualization for Descriptive, Predictive, Prescriptive Analytics		321 – 344 356 – 380
	Hands-on activity: SAS Viya: Artificial Neural Networks (ANN)		733 734
	Final Exam: Take home computer operation exam: due at 9:30 am on 4-26		
14 4/19, 4/21	*Hands-on activity:* SAP Analytics Cloud (SAC)		
	Discussion: Data Mining & Visualization in Data Warehouse and Dashboard Development		
	Lab 8: Data Modeling and Dashboard Design using SAP Analytics Cloud (SAC)		685 - 726
15 4/26, 4/28	Reading 7: Ch. 1 Introduction to Anonymizing Health Data		381 – 400 401 – 408
	Reading 8: Ch. 13 De-Identification and Data Quality: A Clinical Data Warehouse		409 – 418 419
	Ch. 13 Putting it all together in Software Development	Ch. 13	
	Ch. 14 From Imaging to Unveiling	Ch. 14	
16 5/3, 5/5	**Team Project Presentation**		685-686
	Course Review		
17 5/9-5/13	**Final Exam Week:** Concept Test: 10 am – 12 pm, Friday, May 13		

Note: * it is possible, due to extenuating circumstances that exact coverage and sequencing of course content, grading criteria, and weights may change. Students will be notified as far in advance of such changes.