ERP 4220 Introduction to Enterprise Decision Dashboard Prototyping
Course Syllabus – Spring 2024

Department of Business & Information Technology Mission

Capitalizing on the strong technological emphasis of Missouri S&T, the Department of Business and Information Technology prepares individuals for careers in modern business organizations. The Department emphasizes management through technology, with a particular focus on information systems and their application in a fast-changing, global, and competitive environment, to serve the economic interests of industry and the evolving needs of society.

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: IST1750

Class Hours: 4:00-6:30 p.m., Monday
Classroom: Fulton 107A
Office Hours: : in person or via ZOOM
https://umsystem.zoom.us/j/93856974357
11:30 am – 1 pm Tu & Th
And by appointment
Class Web: http://canvas.mst.edu

COURSE CATALOG DESCRIPTION:

Study design and implementation principles for enterprise decision dashboards utilizing data warehouses and databases to support visual analytics. SAP HANA Studio, Design Studio, SAP Analytics Cloud, SAS Viya, or similar tools are used for practical assignments.

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 systems. The main objectives of this course are to stimulate the student's problem-solving abilities and critical thinking skills and to improve the 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	X
• an understanding of roles, applications, and impact of decision dashboards on enterprise mobile strategies and Big Data Analytics	X	X	X			X
• an understanding of principles of Visual Design and Design Thinking in dashboard design and implementation	X	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			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		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: 2810000303272), Missouri S&T Bookstore (https://www.thesandtstore.com/)
  - The course packs have been approved to be a part of the **S&T AutoAccess program** designed to reduce the cost of course materials for students. The lowest cost content has been sourced. If you choose to opt out of the content, please do so via email sent from the University Bookstore to receive a refund**.** You will be sent an AutoAccess Welcome Email that will provide charge amounts, the opt-out process and any additional information needed for your AutoAccess course(s) at the beginning of the semester.

    Your AutoAccess course may have a Print Upgrade available as an additional purchase. This is a low-cost version of the printed text made available by the publisher at a reduced cost. It is the publisher's requirement that in order to purchase the additional print, you must opt in for the AutoAccess digital required material. If you have questions please contact the university bookstore at 573-341-4705, email autoaccess@mst.edu, or visit autoaccess.thesandtstore.com.

GRADING POLICIES AND PROCEDURES:

Midterm Exam (Concepts & Computer Operations)	120 pts	Labs, in-class exercises, and quizzes	650 pts
Final Exam (Concepts & Computer Operations)	120 pts	Team Chapter Presentation	50 pts
		Case Presentation	60 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 their 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. An 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 for 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 Presentation:

Each student will present a decision dashboard implementation case using works developed and completed throughout the semester. The case 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 keep 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 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 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 is provided through the class 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 posting 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. Straightforward 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 in 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 the 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 instructor does not tolerate academic dishonesty of any type**. You don't get a second chance. You don't get to redo work or be forgiven for academic misconduct. You will be assigned a 0 for any assessment where you perform academic misconduct, and the instructor is **required to report the incident to the Department and the University for disciplinary actions** which may include dismissal from the University. You may seek and give assistance on an assignment or project. You may not copy or plagiarize someone else's assignments, including assignments from previous semesters. You may not copy work from anyone else. You may not give someone else your answers. You may not submit someone else's work as your own. This **includes work done by an AI**. You may not do someone else's work for them. If you are caught receiving or giving an answer, this is considered academic dishonesty under university rules. Helping means helping someone figure out the solution themselves. It does not mean giving them the answers. If you don't know or don't want to spend the effort to actually teach someone else how to do something, don't help them. You will get in trouble. **Please note that there are elements designed into this course to cause your cheating to be revealed** (adopted from Dr. Cecil Huang Chua's policies).
- 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.

Report violations of the university's nondiscrimination policies, including Title IX to the Missouri S&T's Equity Officer and Title IX Coordinator at equity@mst.edu or (573) 341-7734 located at 900 Innovation Drive - Suite 500 Rolla, MO 65409. 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/.

KEY DATES:

- The last day to add this course is Monday, January 29
- The last day to withdraw from this course without a "WD" showing on the transcript is Monday, February 26
- The last day for dropping this course is Friday, April 12

ERP 4220 Required Reading List (in Course Pack)

- Reading 1 (**R1**): Ch. 4 Descriptive Analytics II: Business Intelligence and Data Warehousing (pp. 185-248)*, in business Intelligence, Analytics, Data Science, and AI,* 5/E, by Ramesh Sharda, Dursun Delen, Efraim Turban (ISBN-10: 0138043302, ISBN-13: 9780138043308), 2024

- Reading 2 (**R2**): Ch. 18 Dimensional Modeling Process and Tasks, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling (pp. 429-441)*, 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 (pp. 403-426)*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons.

- Reading 4 (**R4**): Ch. 3 Data Warehouse Design Example 1: Ch. 3 Retail Sales, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling (pp. 69-109)*, 3rd Edition, by Ralph Kimball; Margy Ross; ISBN-10 1-118-53080-2, ISBN-13 9781118530801, John Wiley & Sons

- Reading 5 (**R5**) Ch. 6 Data Warehouse Design Example 2: Ch. 6 Order Management, in *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling (pp. 167-198)*, 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 Process, Methods, and Algorithms, in Analytics, Data Science, & Artificial Intelligence: Systems for Decision Support *(pp. 193-250)*, 11th Ed., by Ramesh Sharda, Dursun Delen, Efraim Turban, ISBN-13: 978-0135192016 978-0135192016, 2020, Pearson Publishing.

- Reading 7 (**R7**): Ch. 1 Introduction to Anonymizing Health Data, in *Anonymizing Health* Data (pp. 1-19), 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 *(pp. 185-194)*, in *Anonymizing Health Data*, 1st Edition

ERP 4220 Tentative Course Schedule

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

Week	Topics	Textbook	Course Pack
Week 1 1/16 -1/20	1. Purchase the textbook and course pack		
	2. Review Class Syllabus (Canvas→ Syllabus)		
	3. Complete course Preparation Tasks & Technology Requirement Testing		567 - 587
	4. Complete Pre-Class Survey (Canvas → Assignments)		
2 1/22	Introduction to ERP 4220 and Course Overview		9 - 26
	The Art and Influence of Data Visualization		27 - 42
	Ch. 1. Clarifying the Vision	Ch. 1	43 - 57
	Ch. 2 Common Dashboard Design Mistakes	Ch. 2	58 - 71
	Hands-on activity: SAS Viya: Visual Analytics (online user manual provided in "Week 2 Documents" folder in the Canvas Module section)		
	Assignment: Ch. 1 & Ch. 2 Discussion Question		
3 1/29	Ch. 3 Assessing what's needed?	Ch. 3	72 - 75
	Ch. 4. Fundamental Considerations	Ch. 4	76 - 78
	Hands-on activity: SAS Viya: Visual Analytics: Interaction Objects & Controls		
	Assign Team Chapter Presentation		873 - 874
	Assignment: Lab 1 Visualization and Dashboard Design using SAS Viya: Visual Analytics		599 - 620
4 2/5	Ch. 5 Tapping into the Power of Visual Perception	Ch. 5	79 – 98
	Ch. 6 Achieving Eloquence through Simplicity	Ch. 6	99- 112
	Hands-on activity: Microsoft PowerBI Dashboard & OData Service		
	Notes: Visualization and Design Thinking Persona and User Experience Journey Business Process Modeling		113 – 125 126 – 130 131 - 134
	Assignment: Lab 2: Dashboard Interaction Design using SAS Viya (Visual Analytics Report)		621 – 641
5 2/12	Reading 1: Ch. 3 Descriptive Analytics II: Business Intelligence, Data Warehousing, and Visualization		135 – 166 200 - 221
	Team Chapter Presentation 1: Ch. 7 – Ch.9: Graphs and Display Media	Ch. 7 - 9	
	Assignment: Lab 3:Microsoft PowerBI Dashboard with oData Service	686 -	handout
6 2/19	Reading 1: Ch. 3 Descriptive Analytics II: Business Intelligence, Data Warehousing, and Visualization		166 - 199 221 - 252
	Hands-on activity: In-memory Database Modeling using SAP HANA		668 - 685
	Team Chapter Presentation 2: Ch. 10 – Ch.12: Graphs and Display Media	Ch. 10-12	
	Assignment: Lab 4: SAP HANA Data Modeling: Tables		698 - 716
7 2/26	Introduction to In-Memory Databases for Analytic Applications		644 - 685
	Hands-on activity: SAP HANA Data Provisioning- the ETL Process		686 - 697
	Assignment: Lab 5 SAP HANA Data Modeling: Attribute Views and Analytical Views		717 - 741
8 3/4	Reading 2: Ch. 18 Data Warehouse: Dimensional Modeling Process and Tasks		253 – 266 267 - 278
	Hands-on activity: Dashboards and SAP BusinessObjects Design Studio (Eclipse IDE)		742 - 768
	Midterm Exam: in-class Concept test: **5:30 – 6:30 pm on March 4** Take-home computer operations: due at 4 pm on 3/11		

Week	Topics	Textbook	Course Pack
9 3/11	Reading #3: Ch. 17 Data Warehouse and Business Intelligence Life Cycle		278 – 302 303 - 313
	Hands-on activity: Dashboards and SAP BusinessObjects Design Studio (Eclipse IDE)		742 - 768
	Assignment: Lab 6: Decision Dashboard App Development: Design Studio (Eclipse IDE) and SAP BW data source		769 - 784
10 3/18	Reading #4: Data Warehouse Design Example 1: Retail Sales		314 - 355
	Reading #5: Data Warehouse Design Example 2: Order Management		356 - 388
	Hands-on activity: Microsoft PowerBI connecting to HANA Data Warehouse		
	Assignment: Lab 7: Decision Dashboard App Development: Design Studio (Eclipse IDE) and SAP BW data source		785 - 806
11 3/25	Spring break: 3/24 – 4/3, NO CLASSES		
12 4/1	Reading #6: Ch. 5 Predictive Analytics I: Data Mining Process, Methods, and Algorithm		389 - 421
	Hands-on activity: SAS Viya: Visual Statistics & Data Mining Cluster Analysis Decision Tree		848 - 854
13 4/8	Reading #6: Ch. 5 Data Mining & Visualization for Descriptive, Predictive, Prescriptive Analytics		421 -439
	Hands-on activity: SAS Viya: Artificial Neural Networks (ANN)		855 - 856
	Reading 7: Ch. 1 Introduction to Anonymizing Health Data		520 – 539 540 – 549, 550
	Assignment: Lab 8 Data Mining: Decision Tree, Cluster Analysis, and ANN		849 - 856
14 4/15	Ch. 13 Putting it all together in Software Development	Ch. 13	
	Hands-on activity: SAP Analytics Cloud (SAC)		
	Data Warehouse Example 3: Ch. 4 Inventory		handout
	Reading #8: Ch. 13 De-Identification and Data Quality: A Clinical Data Warehouse		552 – 561 562
	Assignment: Final Exam: Take home computer operation exam: due at 4 pm on 4-22		
15 4/22	Ch. 14 From Imaging to Unveiling	Ch. 14	
	Hands-on activity: SAP Analytics Cloud (SAC)		
	Discussion: Data Mining & Visualization in Data Warehouse and Dashboard Development		
	Assignment: Lab 9: Data Modeling and Dashboard Design using SAP Analytics Cloud (SAC)		807 - 848
16 4/29	**Team Case Presentation**		891 - 892
	Course Review		
17 5/6 - 5/10	**Final Exam Week:** Concept Test: 4 pm – 5 pm, Monday, May 6		

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