King Fahd University of Petroleum and Minerals

KFUPM Business School

Information Systems and Operations Management

Course Syllabus

OM-311: Business Analytics

Second Semester 2022-2023 (222)

Instructor: Mr. Majed Fallatah

Office No.: 24 / 130-1

Contact (Office Phone / Email): 013-860-4634 / mfallatah@kfupm.edu.sa (Please use **OM311** in the email subject)

Office Hours: Sunday : 13 :00 – 15 :00
Monday : 10 :30 – 12 :30
Diffèrent times by an appointement

Class(s) Times:

Sec	Location	Time	Days
311-04	24/165	12:30-13:45	MW
311-05	24/244	14:00-15:15	MW
311-06	24/156	11:00-12:15	UT
430-01	24/151	12:30-13:45	UT

Course Description:

Business analytics is all about implementing quantitative and statistical techniques to explore, explain, and find relationships between data sets' variables through development of explanatory and predictive models to seek fact-based driven management decisions. The course is concerned with a wide variety of managerial decision-making tools currently used in operations and supply chain management Topics such as linear programming, simplex method/duality and sensitivity analyses, integer programming, multi-criteria decision making, network optimization models, simulation, data mining, data visualization and decision theory are included. Emphasis is on the use of spreadsheet modeling and computer software in solving real world decision problems and dealing with big data.

Course Objectives:

To provide learners with:

1. An understanding of how managers use business analytics to formulate and solve business problems and support managerial decision-making.
2. An introduction to the processes needed to procure, visualize, report, and analyze business data.
3. The ability to employ optimization tools and techniques for business problem solving.
4. The ability to employ business analytics software in decision-making.

Course Learning Outcomes:

Upon the successful completion of the course, students should be able to:

1. (Outline the processes and procedures through which management science and business analytics are employed in decision-making related to business and industrial processes (PLO 3.1)
2. Model, mathematically, some of the critical problems faced by organizations (PLO 3.1)
3. Apply business analytics to various business and industrial problems (PLO 3.2)
4. Employ advanced business analytics tools/software for solving real-world problems (PLO 3.2)

Required Textbook:

- **Main:** Evans, James R. (2017) • Business Analytics • 2nd Edition • Pearson • ISBN-10: 129209544X • ISBN-13: 9781292095448 (available at KFUPM Bookstore)
- **Supporting:** Bernard Taylor III (2016) • "Introduction to Management Science" • 12th Global Edition • Pearson • ISBN-10: 1292092912 • ISBN-13: 9781292092911 (available on the web)

Suggested Reference Books:

- Caam, J., Cochran, J., Fry, M., Ohlmann, J. and Anderson, D., "Essentials of Business Analytics", 1st Edition, ISBN-13: 978-1285187273 || ISBN-10: 9781285187273, Cengage Learning, 2014.
- Anderson, Sweeney, and Williams "An Introduction to Management Science," South-Western.
- Albright, S.C. and Winston, W.L. (2013). "Business Analytics: Data Analysis, and Decision Making", 5th Edition, Cengage Learning. ISBN-13: 978-1133629603 || ISBN-10: 1133629601

Suggested Reference Research Journals:

- Management Science
- Operations Research
- Journal of the Operational Research Society
- Omega: Int'l Journal of Management Science
- Decision Sciences
- European Journal of Operational Research
- International Journal of Production Research
- Production Planning and Control
- International Operational Research
- Operations Management
- Production and Inventory Management Journal
- Journal of Industrial Engineering

- ❖ Naval Research Logistics Quarterly
- ❖ Interface

Required Software/Technologies:

- ❖ **Optimization:** MS-Excel; Excel SOLVER Add-In (required)
- ❖ **Data Visualization:** Power Bi / Tableau (Optional)
- ❖ **Data Mining:** MS-Excel; Data Mining
- ❖ **Online Components:** Sufficiently Fast/Reliable Internet Access; Suitable PC/Tablet; Headset; Web Browser; Web Cam; Blackboard Collaborate Ultra;

Teaching Methodology

An interactive learning and applications-driven approach will be followed in the class to convey the whole process of applying Business Analytics in analyzing and solving business problems. Learners are expected to read the material in advance so as to be ready for discussion and presentation. Learners are encouraged to work collaboratively in preparing and learning the course materials. All participants are expected to come well-prepared for class discussions. Emphasis in the course will be on learning through application of Business Analytics and Management Science techniques in addressing real world problems. This would involve both modeling and solving models using general-purpose computer software packages like *MS-Excel* Spreadsheet as well as special-purpose software like *Excel Solver* Add-in.

Active Learning:

Active Learning philosophy emphasizes the fact that the learner is responsible for own learning with educational institutions and educational professionals only providing the support in the learning process. Active participation in class discussions, class activities, helping others in learning the course materials, soliciting help from others in learning the course materials, and so on will make for a livelier, more robust, and more rewarding learning experience. Active participation in activities not only facilities and reinforces learning but also helps in self-evaluation and reflection on learning. Active learning marks will be assigned based on relevant, contextual, insightful, innovative, and supportive comments and participation in the learning process.

Furthermore, the assumption is that all participants would conduct themselves professionally and in line with the professional culture of being present, prepared, and participating. Factors that affect negatively include:

- × Coming late to class
- × Leaving early or in the middle of a class
- × non-conducive or counter-productive behavior in class
- × Being busy with unrelated things, such as a mobile phone, during the class time

Course Evaluation:

Attendance	10%
Participation	05%
Team Project (LP)	10%
Quizzes	20%
Mid-term	25%
Final Exam	30%
TOTAL	**100%**

Grading Scale:

Grade	Exceptional	Excellent	Superior	Very Good	Above Avg.	Good	High Pass	Pass	Fail
Letter Grade	A+	A	B+	B	C+	C	D+	D	F
Range	≥ 95	≥ 90	≥ 85	≥ 80	≥ 75	≥ 70	≥ 65	≥ 60	< 60

General Instructions (course evaluation criteria):

Each of you is considered a responsible adult in a professional business setting, so please make sure you read and understand the content of this syllabus. In case you have questions please don't hesitate to ask me.

1. Attendance Polity:
   - Formal attendance will be taken daily during class time
   - Attendance grade will be calculated as a percentage of total classes as follows:
     1. Present = 1
     2. Excused = 1 (official excuses authenticated by Students Affairs)
     3. Late: = - 0.75 (10 minutes after the class has started)
     4. Absent = -1.25 (15 minutes after the class has started)
   - By university's regulations, missing 20% of the classes (i.e. 6 classes) without official excuses will yield a DN grade
2. Class preparation activities (quizzes, homework, class discussion) will be announced during class time or by email with the required details and material
3. In the exams, you should expect multiple-choice problems, true and false statements, and questions that require calculation. Formula sheet will be provided. By university's policy, cheating of any kind is strictly prohibited (please refer to The Undergraduate Study and Examination Regulations)
4. Grade Calculation:
   - Final grades will be calculated and curved based on the overall performance. There is no such thing as bonus or extra work at the end of the semester. Once finalized, grades will be posted on blackboard for review.
   - Make sure to monitor your own scores and compare it with scores on blackboard for possible variations or possible omissions.
5. **Responsibility:**
   - Please make sure you read and understand the content of this syllabus. In case you have questions please don't hesitate to ask me. (I did not know/understand is not an excuse)

Academic Calendar

Day	Week	Gregorian Date	Events
SUNDAY	1	Jan. 15, 2023	REGISTRATION CONFIRMATION thru KFUPM Portal
SUNDAY	1	Jan. 15, 2023	Classes begin
TUESDAY	1	Jan. 17, 2023	Last day for registration confirmation (11:59 PM) - Last day for adding courses
THURSDAY	2	Jan. 26, 2023	Last day for dropping course(s) without permanent record
SUNDAY-THURSDAY	4	Feb. 5, 2023-Feb. 9, 2023	Registration for Co-op/Internship in 223/231 and Summer Training 223
WEDNESDAY-THURSDAY	6	Feb. 22, 2023-Feb. 23, 2023	Saudi Founding Day
SUNDAY	7-8	Feb. 26, 2023	Midterm grade reports due in the Deanship thru KFUPM Portal (2 weeks)
SUNDAY	9-10	March 12, 2023-March 23, 2023	Advisor Approval for Early Registration (2 weeks)
THURSDAY	10	March 23, 2023	Last day for dropping course(s) with grade of "W" thru KFUPM Portal*
SATURDAY	11	March 25, 2023	Beginning of Early Registration for the Summer Session 2023 (223), and the First Semester 2023-2024 (231)
THURSDAY	13	April 13, 2023	Last day before Ramadhan break
		April 14, 2023-April 27, 2023	Eid Al-Fitr Holidays
SUNDAY	14	April 30, 2023	Classes resumes after Ramadhan Break
THURSDAY	14	May 4, 2023	Last day for major exam; Last day for withdrawal from all courses with grade of "W"
SUNDAY-THURSDAY	15	May 7, 2023-May 11, 2023	Normal classes
SUNDAY	16	May 14, 2023	Normal Wednesday classes
MONDAY	16	May 15, 2023	Normal Thursday classes - Last Day of classes for the term
TUESDAY	16	May 16, 2023	Exam preparation break
WEDNESDAY-MONDAY	16-17	May 17, 2023-May 29, 2023	Final examinations
THURSDAY	18	June 1, 2023	Last day for faculty to submit grades to the Deanship (2:00 PM); Official Graduation Date

Course Schedule (75 minutes Meetings):

Week	Topic(s)	Readings/Due	
1	Introduction to Business Analytics	Chap. 1	
	Introduction to Business Analytics	Chap. 1	
2	Business Analytics using Spreadsheets	Chap. 2	
	Business Analytics using Spreadsheets	Chap. 2	
3	Data Visualization (Excel/Power Bi as applicable)	Chap. 3	
	Data Mining	Chap 10	Quiz 1
4	Data Mining	Chap 10	
	Data Mining	Chap 10	
5	Spreadsheet Modeling and Analysis	Chap 11	
	Spreadsheet Modeling and Analysis	Chap 11	
6	Spreadsheet Modeling and Analysis	Chap 11	
	Monte Carlo Simulation and Risk Analysis (data tables)	Chap. 12	
7	Monte Carlo Simulation and Risk Analysis (@Risk)	Chap. 12	
	Monte Carlo Simulation and Risk Analysis (@Risk)	Chap. 12	Quiz 2
8	No Class		
	Midterm Exam March 4th, 18:00 P.M, Location: TBA, Material (Chapter 1 – Chapter 12)		
9	Linear Optimization: Mathematical Modeling/Graphical Solution/Simplex Method	Chap. 13	
	Linear Optimization: Excel Solver	Chap. 13	
10	Linear Optimization: Excel Solver / Sensitivity Analysis using Solver	Chap. 13	
	Linear Optimization: Excel Solver / Sensitivity Analysis using Solver	Chap. 13	
11	Linear Optimization: (Process Selection / Blending / Multiperiod Models)	Chap. 14	
	Linear Optimization: (Portfolio Investment / Transportation Models)	Chap. 14	
12	Linear Optimization: (Production / Marketing Allocation)	Chap. 14	
	Integer Optimization: General Integer Variables	Chap. 15	
13	Integer Optimization: Binary Integer Variables	Chap. 15	
	Integer Optimization: Mixed Integer Variables	Chap. 15	Quiz 3
	April 14th –27th Ramadan Break		
14	Network Models: Transportation + Transshipment + Assignment	Handouts	
	Network Algorithms: Shortest Path, Minimal Spanning Tree, Maximal Flow	Handouts	
15	Network Algorithms: Shortest Path, Minimal Spanning Tree, Maximal Flow	Handouts	
	Advanced Topics (Multicriteria Decision Making) – AHP	Handouts	
16	Advanced Topics (Multicriteria Decision Making) – AHP	Handouts	Quiz 4
	Project is Due (Through Blackboard)		
*	**Final Exam – TBD**		

Good Luck!!!

The course instructor reserves the right to add or delete from this schedule and syllabus. Changes may be necessary to accommodate time constraints and will be announced in class in a timely manner.