**ILR 525: HR Data Analytics**

**Section 001 | CRN: 87832 | Fall 2019**

**Instructor:** James G. Field, Ph. D.

**Office location:** John Chambers College of Business & Economics Building Room 116

**Office hours:** MW: 10:00AM – 1:00PM

 (or by appointment [can meet in the office or online])

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**Twitter:** [@fieldjamie](https://twitter.com/fieldjamie)

**Class website:** <https://jamiefield.github.io/portfolio/>

**Meeting times:** MW | 4:00PM – 5:15PM

**Meeting location:** Mountainlair Room 114

**College website:** <https://business.wvu.edu/>

**Program website:** <https://business.wvu.edu/graduate-degrees/ms-industrial-relations>

**AY 2019-2020 Calendar:** [AY2019-2020 Academic Calendar](https://provost.wvu.edu/files/d/f16a8943-1fab-4c8c-837d-67828809ae11/academic-calendar-2019-2020_060619.pdf)

**Course Description:**

This course introduces quantitative techniques related to human resource (HR) management. The primary objective is to expose and equip students with quantitative and statistical techniques used in the field of HR to make decisions related to workforce utilization, support employee development, and maximize organizational goals. Students will work with databases, collection of data, statistical packages, data interpretation, and data visualization. The assignments will focus on making data-driven HR decisions and explore how to effectively communicate findings both visually and verbally.

**Course Goals:**

Upon completing this course, students will be able to

* Distinguish between different data sources and types – and communicate advantages and disadvantages of each.
* Formulate research questions that will help to address organizational issues (e.g., individual performance, turnover behavior).
* Evaluate psychometric properties of raw data.
* Identify issues in data sets (e.g., outliers, non-normal distributions) that may bring into question the robustness of empirical results.
* Estimate, interpret, and communicate descriptive statistics.
* Compare means between multiple groups (i.e., t-test [two group comparison]; ANOVA [three or more group comparison).
* Evaluate the linear association between two variables (i.e., correlation and simple linear regression).
* Combine the effects of a set of multiple predictor variables on a criterion variable (i.e., multiple regression/correlation)
* Evaluate the incremental variance (i.e., hierarchical regression and moderation)
* Visual research findings.
* Summarize and communicate meta-analytic findings.
* Perform analyses in R and/or Microsoft Excel.
* Make evidence-based practice recommendations.

**Course structure:**

I hope to make the class as engaging and interesting as possible to help you grasp course content. To do so, this course uses readings, lectures, exercises, cases, film clips, team assignments, and class discussion. Engagement, however, is a two way street, and requires that you have an active investment in the course. I have high expectations that you complete readings before class, complete all assignments, and come to class prepared to contribute. Each of you brings unique perspectives to the class; participation is essential to not only your learning, but the learning of your peers.

The course will be split up into five modules. Each module will be made up of five class. Each module will unfold as follows:

* Sessions 1-3: Lectures on HR analytics material
* Session 4: A review of Sessions 1-3 and a demonstration of analytic software.
* Session 5: A hackathon – an intense in-class scenario-based exercise (for credit) in which

small student groups work independently to formulate present evidence-based recommendations/conclusions.

**Course media:**

Throughout the semester I will post to eCampus video lessons/tutorials that will promote learning in this class. The purpose of these videos will be to reinforce concepts covered in the classroom, to answer questions raised by student, and to demonstrate statistical analysis software. Please note that I am a complete novice when it comes to this. As such, please be patient with me. I will do my best to upload something every 1-2 weeks, but I cannot promise that it will be professional quality. Beyond the media posted to eCampus, I encourage you to follow my Twitter account ([@fieldjamie](https://twitter.com/fieldjamie)) and personal page (<https://jamiefield.github.io/>) for interesting articles related to HR analytics and other organizational research topics.

**Course materials:**

1. Textbook(s)
	1. [Discovering Statistics Using R](https://us.sagepub.com/en-us/nam/discovering-statistics-using-r/book236067) by Field, Miles, Field.
		1. ISBN 9781446200469.
	2. [An Adventure in Statistics: The Reality Enigma](https://www.discoveringstatistics.com/books/an-adventure-in-statistics/) by Field, A.
		1. ISBN 9781446210451
	3. [Microsoft Excel 2016 Bible](https://www.wiley.com/en-us/Excel%2B2016%2BBible-p-9781119067511) by Walkenbach, J.
		1. ISBN: 9781119067511
2. Statistical analysis tools
	1. R
		1. More information on this open-source software can be found at this link: <https://www.r-project.org/about.html>.
		2. Please watch this video for a basic overview of the software: [insert link to my github site]
		3. I encourage you to install R on the computer that you use for homework assignments.
			1. Note that R requires two installations.
				1. To install R, please follow these steps:

Visit [https://cran.r-project.org/](https://cran.r-project.org/%20) and select the appropriate option from the top window (e.g., Windows, Mac OS).

Visit [https://www.rstudio.com/products/rstudio/download/#download](https://www.rstudio.com/products/rstudio/download/%23download) and select the appropriate download option (e.g., Windows, Mac OS).

* + - 1. There exists a lot of great online resources that will help you to improve your programming skills in R. Here are just a few examples:
				1. [https://stackoverflow.com/](https://stackoverflow.com/%20) (This is probably the best one in my opinion)
				2. <http://www.r-tutor.com/>
				3. <https://www.r-bloggers.com/>
				4. <http://www.statmethods.net>
	1. Microsoft Excel
		1. All analyses will be performed in R (see above). However, when able, I will provide a tutorial on how to replicate these analyses in Excel.

**Class requirements - Individual:**

1. Exam (100 points)
	* One exam will be administered during the semester. The exam will be distributed via eCampus and you will be given approximately five days to complete it. The exam will not follow any one particular format. As such, please expect to see multiple choice-, true/false-, short answer, and computational-style questions. Exam material will be drawn from lectures, course notes, supplemental readings, in-class discussions, and other materials distributed to the class. There may be material on the exam that comes from course materials (see above) that we do not discuss in class, and there will be material that we discussed in class that is not in the readings. Thus, you must come to class and keep up with the material to do well on the exam. One does not substitute for the other. Here are the target dates for Exams 1 (note that these may change)
		1. Exam 1
			1. Posted on 10/28/2019
			2. Due on 11/04/2019 (by 11:59PM ET)
	* There will be a review session before the exam. Here are the review session details:
		1. Exam 1 Review
			1. Date: 10/23/2019
			2. Time: 5:30 – 7:00PM
			3. Location: B&E 240
2. Homework assignments (20 points each × 5 = 100 points total)
	* There will be a homework assignment for each module. You will have one week to complete each assignment. Homework assignments will not follow any particular format. Therefore, assignments in R, multiple choice questions, short answer questions, blogs, etc. are all fair game. The dates on which each homework is assigned and due are predetermined and, thus, appear in the course schedule below. *No late/missed homework assignments will be accepted (unless a University-approved excuse is provided).*

|  |  |  |  |
| --- | --- | --- | --- |
| Assignment # | Assigned on | Due on | Topic |
| 1 | 9/11/2019 | 9/17/2019 | Data types |
| 2 | 9/30/2019 | 10/02/2019 | Comparing means |
| 3 | 10/23/2019 | 10/28/2019 | Correlations |
| 4 | 11/06/2019 | 11/11/2019 | Incremental variance |
| 5 | 12/04/2019 | 12/09/2019 | Moderation |

1. Class participation (50 points)
	* Attendance will be taken every day (in one form or another). You are expected to attend each class period and actively participate. Active participation includes bringing in news articles that relate to management topics, responding to questions, participating in class discussions, etc. Remember that all material presented in class including class discussions are fair game for the exams. Quality participation in class discussions may raise your participation grade while excessive absences and tardiness may result in a reduction of your participation grade. Exceptional participation may lead to extra credit points. Other tools used to assess your participation may include reading checks and pop quizzes. We are scheduled to meet \*in class\* 26 times this semester. You will be awarded 1.54 points each day that you attend class and are marked present (e.g., sign the sign-in sheet). Attend every class and you will earn 40 points. The outstanding ten points will be awarded based on the professor’s subjective rating of each student’s class participation.
	* Since you are expected to participate in class discussions, it goes without saying that you are expected to attend class (on time…prepared…awake). By signing up for my class, you agree that you can meet from 4:00PM to 5:15PM in its entirety on Monday and Wednesday on the scheduled dates in the fall 2019 semester. If your school schedule, work schedule, social schedule, family obligations, etc. prevent this from occurring on a regular basis, do not sign up for this class. I understand that circumstances may arise that will prevent you from attending class. As adults, I expect you to use your discretion and good judgment. If you are sick, have an important medical appointment, need to attend a friend/family wedding, funeral, or other life-changing event, please do! However, you are responsible for making up the material that you missed.

**Class requirements - Group:**

1. Meta-Sim Project (200 points)
	1. Introduction
		1. This semester we will try out a new group project exercise, one that will rely on a simulated data set that I developed. In class I will explain in more detail how the data set was created. In a nutshell, the data set is intended to represent a large-scale data collection effort from employees in one or more organizations (imagine collecting a lot of data using Qualtrics). The data set was generated from a 50$×$49 meta-analytic correlation matrix that was populated from a series of metaBUS (see [metaBUS.org](file:///C%3A%5CUsers%5CJamie%5CDownloads%5CmetaBUS.org)) queries. This means that all descriptive statistics, correlations, etc. are supported by meta-analytic evidence and, thus, reflect phenomena in the \*real\* world. Project teams will use the simulated data set to complete a semester-long project, which will require them to use an established theoretical model to examine at least five research questions. A project timetable is provided below and should help groups to stay on track.
	2. What research questions must be asked?
		1. Each group must examine the following questions\*:
			1. Does a group difference exist with regard to a particular substantive phenomenon? (For example: Are males paid more than females?)
			2. What is the association (i.e., correlation and variance explained) between two constructs?
			3. What is the association (i.e., correlation and variance explained) between two constructs?
			4. Formulate and examine a predictive model that includes at least three predictor variables (max. = 5).
			5. What incremental variance is added to the aforementioned model (see #4) when an additional substantive variable is added?

\*Note that all research questions *must* be supported by theory (i.e., there must be a reason for what you propose).

* 1. What must be submitted?
		1. Each group will be required to submit (1) a five page executive summary [worth 100 points] and (2) an oral presentation [worth 100 points]. Specific details pertaining to each deliverable follow.
			1. Executive report: Each project team must prepare a five page executive summary that comprehensively summarizes the project and the corresponding findings. The formatting requirements are:
				1. Up to five pages long
				2. Font: Times New Roman
				3. Font size: 12
				4. Spacing: Single space
				5. A separate title page and bibliography must also be submitted
				6. Formatting style (e.g., references, tables, figures): APA

**\*\*The Executive Report is due on Wednesday, December 4\*\***

* + - 1. Presentation: Each group will also have to give a presentation in front of the instructor, their peers, and other invited guests (e.g., other faculty). Each presentation will last up to 30 minutes.

**\*\*Presentations will begin on Wednesday, December 4\*\***

* 1. What are the deadlines?
		1. 09/16/2019 Project pre-registration (A completed pre-registration form,

which will be provided by the instructor must be submitted by this date)

* + 1. 10/07/2019 Analyses for Research Question 1 (e.g., descriptive statistics,

mean comparisons)

* + 1. 10/28/2019 Analyses for Research Questions 2 and 3 (e.g., correlation

matrix, regression analyses)

* + 1. 11/13/2019 Analyses for Research Questions 4 and 5 (e.g., multiple

regression analyses, hierarchical regression analyses)

* + 1. 12/04/2019 Executive summary due and first day of presentations
1. Hackathons (50 points)
	1. At the end of Modules 2, 3, and 4, students will work in small groups to offer evidence-based (i.e., data-driven) recommendations to scenario-based problems. Each submission will be evaluated based on how well the recommendations are articulated and rigor of the corresponding analyses. Thus, each submission must include a rank ordered list of well-articulated recommendations and an analytic script (e.g., R script, a formula-driven Excel spreadsheet) that can be used to replicate all analyses. More details will be shared as we approach the first hackathon, which will take place on Monday, October 7th.

**Grading:**

|  |  |  |
| --- | --- | --- |
| **Item** | **Points** | **% of overall grade** |
| Homework assignments | 100 points | 20% |
| Exam 1 | 100 points | 20% |
| Attendance/Participation | 50 points | 10% |
| Meta-Sim Project: Report | 100 points | 20% |
| Meta-Sim Project: Presentation | 100 points | 20% |
| Hackathons | 50 points | 10% |
| **TOTAL** | **500 points** | **100%** |

|  |  |
| --- | --- |
| **Grade** | **Percentage** |
| A | $>$ 90 |
| B | 80 $\leq $ x $\leq $ 90 |
| C | 70 $\leq $ x $\leq $ 80 |
| D | 60 $\leq $ x $\leq $ 70 |
| F | $<$ 60 |
| *Note*: x = final grade. |

**Course Policies:** This course will adhere to all other policies as established and outlined by West Virginia University. Standard policy information can be obtained at: <https://tlcommons.wvu.edu/syllabus-policies-and-statements>

**TENTATIVE COURSE SCHEDULE\*\***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Week** | **Class** | **Module**  | **Module Theme** | **Topic** | **Notes**  |
| 8/21 (W) | 1 | 1 | - | Roadtrippin’! | Welcome and course introduction |  |
| 8/26 (M) | 2 | 2 | 1 | Everything data  | HR analytics: What is the point of it?  |  |
| 8/28 (W) | 2 | - | - | - | NO CLASS | MSIR trip to Marathon |
| 8/30 | 2 | - | - | - | MSIR Picnic @ [Krepps Park](https://goo.gl/maps/4R3An9mevX44c23b9) (12 – 2:00PM) |  |
| 9/2 (M) | 3 | - | - | - | NO CLASS | Labor Day  |
| 9/4 (W) | 3 | - | - | - | NO CLASS(take-home assignment to be completed) | MSIR trip to JLG  |
| 9/9 (M) | 4 | 3 | 1 | Everything data | Data sources; data types; concepts of validity | MSIR trip to EATON  |
| 9/11 (W) | 4 | 4 | 1 | Everything data | Roadblock: Data issues |  |
| 9/16 (M) | 5 | 5 | 1 | Everything data | Recap of Module 1 and introduction to analytic software | GROUP: Pre-registration |
| 9/18 (W) | 5 | 6 | 1 | - | Roundtable Series: Guest speakers TBD |  |
| 9/23 (M) | 6 | 7 | 2 | Descriptive statistics | Central tendency; skewness; kurtosis |  |
| 9/25 (W) | 6 | 8 | 2 | Descriptive statistics | Difference in means: *t*-test |  |
| 9/30 (M) | 7 | 9 | 2 | Descriptive statistics | Difference in means; ANOVA |  |
| 10/2 (W) | 7 | 10 | 2 | Descriptive statistics | Recap of Module 2 and software tutorial (How to estimate and visualize descriptive statistics in R and Microsoft Excel) |  |
| 10/7 (M) | 8 | 11 | 2 | - | In-class hackathon: Using descriptive statistics to evaluate whether discrimination potentially taking place? | GROUP: RQ #1 |
| 10/9 (W) | 8 | - | - | - | NO CLASS | SMA Conference |
| 10/14 (M) | 9 | 12 | 3 | General linear model | Introduction and assumptions |  |
| 10/16 (W) | 9 | 13 | 3 | General linear model | Estimating a continuous outcome variable |  |
| 10/21 (M) | 10 | 14 | 3 | General linear model | Estimating a dichotomous outcome variable |  |
| 10/23 (W) | 10 | 15 | 3 | General linear model | Recap of Module 3 and software tutorial (How to estimate a bivariate relation in R and Microsoft Excel) | Exam 1 review |
| 10/28 (M) | 11 | 16 | 3 | - | In-class hackathon: Estimating drivers of individual employee performance and turnover behavior. | GROUP: RQs #2 & 3Exam 1 posted |
| 10/30 (W) | 11 | 17 | 4 | Hierarchical regression | Introduction and assumptions |  |
| 11/4 (M) | 12 | 18 | 4 | Hierarchical regression | Multiple regression and predictive analytics | Exam 1 due |
| 11/6 (W) | 12 | 19 | 4 | Hierarchical regression | Incremental variance and predictive analytics |  |
| 11/11 (M) | 13 | 20 | 4 | Hierarchical regression | Recap Module 4 and software tutorial (How to predict outcomes in R and Microsoft Excel) |  |
| 11/13 (W) | 13 | 21 | 4 | - | In-class hackathon: What should we be looking for in a job candidate?  | GROUP: RQs # 4 & 5 |
| 11/18 (M) | 14 | 22 | 5 | Advanced analytic tools | Moderation and mediation |  |
| 11/20 (W) | 14 | 23 | 5 | Advanced analytic tools | Meta-analysis |  |
| 11/25 (M) | 15 | - | - | - | NO CLASS | FALL RECESS |
| 11/27 (W) | 15 | - | - | - | NO CLASS | FALL RECESS |
| 12/2 (M) | 16 | - | - | - | NO CLASS | Prep for presentation |
| 12/4 (W) | 16 | 24 | - | - | Meta-Sim Presentations (Groups 1, 2, 3) | GROUP: Exec report due |
| 12/9 (M) | 17 | 25 | - | - | Meta-Sim Presentations (Groups 4, 5, 6) |  |
| 12/11 (W) | 17 | 26 | - | - | Meta-Sim Presentations (Groups 7, 8, 9) |  |
| 12/16 (M) | 18 |  | NA |  | NO CLASS | FINALS WEEK |
| 12/18 (W) | 18 |  | NA |  | NO CLASS | FINALS WEEK |

**\*\*** **Professor of Record reserves the right to modify the syllabus in necessary or meaningful ways, including: to correct errors, to adjust schedule due to inclement weather, or to amend academic topics covered.**