

# 2024 Summer Statistics & Research Workshop Series

From May 14 to May 30, 2024

All sessions are virtual via Webex, join in link: <https://ecu.webex.com/meet/bianh>

Week 1: R series	Tuesday (May 14)	Wednesday (May 15)	Thursday (May 16)
	SPSS intro (9:00-11:00am) Dr. Courtney Baker	Power BI intro (9:00-11:00am) Mr. Greg Harris	Python intro (9:00-11:00am) Dr. Hui Bian
SAS intro (1:00-3:00pm) Dr. Xiangming Fang	R intro (1:00-3:00pm) Dr. Alex Schoemann	LaTeX intro (1:00-3:00pm) Dr. Qiang Wu	

Week 2: Statistics	Tuesday (May 21)	Wednesday (May 22)	Thursday (May 23)
	Descriptive statistics (9:00am-12:00pm) Dr. Kevin O'Brien	T tests and ANOVA (9:00am-12:00pm) Dr. Kevin O'Brien	Logistic regression (9:00am-12:00pm) Dr. Alex Schoemann
Inferential statistics (1:00-4:00pm) Dr. Peng Xiao	Linear regression (1:00-4:00pm) Dr. Courtney Baker	Time series (1:00-4:00pm) Mr. Franklin Zhou	

Week 3: Special Topics	Tuesday (May 28)	Wednesday (May 29)	Thursday (May 30)
	Instrument design (9:00-11:00am) Dr. Whitney Moore	Meta-analysis (9:00-11:00am) Dr. Alex Schoemann	Multilevel modeling (9:00-11:00am) Dr. Hui Bian
Survival analysis (1:00-3:00pm) Dr. Hui Bian	Multi-categorical and count data (1:00-3:00pm) Dr. Qiang Wu	Structural equation modeling (1:00-3:00pm) Dr. Whitney Moore	

For details, please go to <https://ofe.ecu.edu/office-for-faculty-excellence/ofe-sessions/> or contact Dr. Hui Bian at [bianh@ecu.edu](mailto:bianh@ecu.edu)

<b>Workshops</b>	<b>Date</b>	<b>Time</b>	<b>Registration</b>
<b>SPSS Intro</b>	5/14/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_9LAihTiscnroWa2">https://ecu.az1.qualtrics.com/jfe/form/SV_9LAihTiscnroWa2</a>
<b>SAS Intro</b>	5/14/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_2i8aNw0kibPn1Ai">https://ecu.az1.qualtrics.com/jfe/form/SV_2i8aNw0kibPn1Ai</a>
<b>Power Bi Intro</b>	5/15/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_bIMe1owHFT4yUiq">https://ecu.az1.qualtrics.com/jfe/form/SV_bIMe1owHFT4yUiq</a>
<b>R intro</b>	5/15/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_byJeP2voXrzaBHE">https://ecu.az1.qualtrics.com/jfe/form/SV_byJeP2voXrzaBHE</a>
<b>Python Intro</b>	5/16/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_9LAt2sd7LkjCD8q">https://ecu.az1.qualtrics.com/jfe/form/SV_9LAt2sd7LkjCD8q</a>
<b>LaTeX Intro</b>	5/16/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_2c5hAx6ys6r5YDY">https://ecu.az1.qualtrics.com/jfe/form/SV_2c5hAx6ys6r5YDY</a>
<b>Descriptive statistics</b>	5/21/2024	9:00am-12:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_d0dpTD2PZE7NLNA">https://ecu.az1.qualtrics.com/jfe/form/SV_d0dpTD2PZE7NLNA</a>
<b>Inferential statistics</b>	5/21/2024	1:00pm-4:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_0CeDqUc8uRlqt0y">https://ecu.az1.qualtrics.com/jfe/form/SV_0CeDqUc8uRlqt0y</a>
<b>T test and ANOVA</b>	5/22/2024	9:00am-12:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_befo2OZrJ970Nr8">https://ecu.az1.qualtrics.com/jfe/form/SV_befo2OZrJ970Nr8</a>
<b>Linear regression</b>	5/22/2024	1:00pm-4:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_9Am0EsuSGPw1N2e">https://ecu.az1.qualtrics.com/jfe/form/SV_9Am0EsuSGPw1N2e</a>
<b>Logistic regression</b>	5/23/2024	9:00am-12:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_6QKkMmVvyHGMGNw">https://ecu.az1.qualtrics.com/jfe/form/SV_6QKkMmVvyHGMGNw</a>
<b>Time series</b>	5/23/2024	1:00pm-4:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_aeKxvbKvTwfODd4">https://ecu.az1.qualtrics.com/jfe/form/SV_aeKxvbKvTwfODd4</a>
<b>Instrument design</b>	5/28/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_eR44Or3isHXfUns">https://ecu.az1.qualtrics.com/jfe/form/SV_eR44Or3isHXfUns</a>
<b>Survival analysis</b>	5/28/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_0SNwuZdx6HgTzNk">https://ecu.az1.qualtrics.com/jfe/form/SV_0SNwuZdx6HgTzNk</a>
<b>Meta-analysis</b>	5/29/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_cMbooylv8SMwiKW">https://ecu.az1.qualtrics.com/jfe/form/SV_cMbooylv8SMwiKW</a>
<b>Multi-categorical and count data</b>	5/29/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_b4xoVCtQHNRcCwa">https://ecu.az1.qualtrics.com/jfe/form/SV_b4xoVCtQHNRcCwa</a>
<b>Multilevel modeling</b>	5/30/2024	9:00am-11:00am	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_cT0FLgTJrJGLXb8">https://ecu.az1.qualtrics.com/jfe/form/SV_cT0FLgTJrJGLXb8</a>
<b>Structural equation modeling</b>	5/30/2024	1:00pm-3:00pm	<a href="https://ecu.az1.qualtrics.com/jfe/form/SV_9WTrg8INJIWj1hs">https://ecu.az1.qualtrics.com/jfe/form/SV_9WTrg8INJIWj1hs</a>

Note. Workshop Webex link: <https://ecu.webex.com/meet/bianh>

## Workshop Descriptions for 2024 Statistics/Research Series

### **SPSS Intro (9-11am, 5/14)**

This workshop serves as a basic introduction to using SPSS. We will explore the SPSS interface, file types, variable coding and recoding, case selection and sorting and basic descriptive statistics.

### **SAS Intro (1-3pm, 5/14)**

This workshop will focus on some basics of the SAS program, including reading/importing data into SAS, data manipulation in SAS, and data description (graphs and numerical summaries) using SAS. Commonly used statistical tests (such as t-tests, ANOVA and non-parametric tests) will also be covered without technical details.

### **Power Bi Intro (9-11am, 5/15)**

This workshop serves as a basic introduction to using Microsoft Power BI. In this workshop, we will: describe the business value and features of Power BI; compare and contrast the different components that make up Power BI; describe how to clean and transform data; build a basic dashboard; and consume Power BI reports and dashboards.

### **R intro (1-3pm, 5/15)**

R is a free and open-source software package for computing and statistical analysis. It has tons of packages dealing with advanced and complex analysis specifically for different fields. Due to its flexibility in coding, R is now one of the most popular programs among statisticians and other researchers. This workshop will cover the basics of R package and programming as well as data description and statistical analysis including correlation, regression, t-test, ANOVA, and two-way tables with Chi-square test.

### **Python Intro (9-11am, 5/16)**

This workshop for people who don't know much about Python. We will use Spyder in Anaconda to do programming. Spyder is an integrated development environment for Python (IDE). We will learn the interface of Spyder, how to read external data files into Spyder, data management (select cases and recode variables), how to get plots, and how to analyze data including Chi-square test, correlation analysis, t test, ANOVA, and linear regression analysis.

### **Latex Intro (1-3pm, 5/16)**

This workshop is for people of no experience with Latex. We will learn how to set up a Latex system and how to use Latex to produce beautiful documents. Latex is a document preparation system for high-quality typesetting. It is the most useful for median-to-large documents such as books, technical reports, scientific papers, or slide presentations. Latex allows authors to concentrate on the content but not the appearance of the document. With some general layout parameters, the system processes the document and determines the best layout automatically. Latex is the best system to typeset scientific and mathematical notations. It is also very easy to handle bibliography and cross references in Latex. Professional journals usually accept Latex files for publications.

### **Descriptive statistics (9am-12pm, 5/21)**

In this workshop we will cover descriptive statistical approaches for both Categorical and scale variables. The methods will cover both graphical and numerical description. IBM SPSS software will be used to demonstrate these analyses. A clear distinction will be made between descriptive statistical approaches and inferential approaches as well as the link between them.

### **Inferential statistics (1-4pm, 5/21)**

The workshop is aimed to equip participants with the tools needed to analyze real-world data and to justify their use through theory. Together, we will study basic concepts related to statistical inference and examine commonly used methods, with an emphasis on understanding when and how to apply them. You will also learn how use these methods on the statistical software R.

### **T test and ANOVA (9am-12pm, 5/22)**

This workshop will cover the use of Students t-test and its various forms for a single sample (group), two independent samples or groups, and paired or matched data. Concepts of hypotheses testing will be briefly covered. These analyses will then be generalized to cover more than two groups in Single Factor ANOVA as well as cover two or more factors in an ANOVA. IBM SPSS software will be used to demonstrate these analyses.

### **Linear regression (1-4pm, 5/22)**

This workshop serves as a basic introduction to multiple regression. We will cover the underlying statistical assumptions, what happens when they are violated and ways to address those violations, interpreting regression coefficients, and model fit. We'll do a demonstration through SPSS.

### **Logistic regression (9am-12pm, 5/23)**

This workshop serves as a basic introduction to logistic regression. Logistic regression is used when the outcome variable in a regression model is binary, e.g., yes/no. We will review the basics of the underlying logistic regression models and focus on fitting models and interpreting results using common statistical software such as R and SPSS.

### **Time series (1-4pm, 5/23)**

This workshop provides the introduction to time series forecasting. We will go over time series graphics, time series decomposition, time series features, time series regression models, exponential smoothing methods, and ARIMA models. R will be used to show the work.

### **Instrument design (9-11am, 5/28)**

Designing a new instrument (e.g., survey) takes several steps. This workshop will review the steps from concept to piloting to conducting factor analysis to build content validity and finally criterion validity.

### **Survival analysis (1-3pm, 5/28)**

Survival analysis is time-to-event analysis. It is a statistical method used to analyze and model the time until an event of interest occurs. Survival analysis is particularly useful when studying time related events such as death, disease recurrence, graduation from college, etc. In this workshop, Kaplan-Meier and Cox proportional hazards regression will be introduced.

### **Meta-analysis (9-11am, 5/29)**

This workshop will provide a basic introduction to meta-analysis and systematic reviews. Topics will include methods of searching the empirical literature, coding effect sizes, and analyzing effect sizes across multiple studies using common statistical software such as R and SPSS.

### **Multi-categorical and count data (1-3pm, 5/29)**

This workshop is an introduction to multi-categorical and count data analysis. For multi-categorical data, we will introduce the multinomial model and the cumulative odds model. For count data, we will introduce the Poisson model and the negative Binomial model. We will also discuss the issues of over-dispersion and zero-inflation. Real data examples will be given, and SAS software will be used for the demonstration.

### **Multilevel modeling (9-11am, 5/30)**

This workshop will give you an introduction of multilevel modeling. The workshop focuses more on the concept and two-level models. However, the examples of analyzing cross-sectional and longitudinal data using SPSS and R will be presented.

### **Structural equation modeling (1-3pm, 5/30)**

During this introductory workshop we will cover the foundational concepts of confirmatory factor analysis (CFA) and structural equation modeling (SEM). CFA topics covered will include scale setting and testing measurement invariance (i.e., configural, weak, and strong invariance). Then, SEM topics will include testing homogeneity of parameters by constraining parameters to equality and testing parameters for significance with the nested model chi-square test by constraining parameters to 0. Example materials for analyses will be provided for using the *lavaan* package in R.