



**Birla Institute of Technology & Science, Pilani**  
Hyderabad Campus

**FIRST SEMESTER 2023-2024**  
Course Handout Part II

Date: 11-08-2023

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

*Course No.* : ECON F215  
*Course Title* : Computational Methods for Economics  
*Instructor-in-Charge* : Rishi Kumar

**Scope and Objective of the Course:**

This course is to introduce various methods of computational approaches for addressing various issues pertaining to economic decisions. It would help students to develop a deep background in advanced tools for analysis of economic data. This course gives students a hands-on introduction to the econometric tools and practices required to address economic problems in the real world. Students will be introduced to modern statistical learning tools through learning by-doing mode. The course will provide many practical data examples of applying causation in data science and prediction techniques to solve actual business problems.

**Textbooks(TB):** Matt Taddy (2019) “Business Data Science: Combining Machine Learning and Economics to Optimize, Automate, and Accelerate Business Decisions” McGraw Hill; 1st edition

**Reference books**

1. Scott Cunningham, Causal Inference-The Mixtape, Yale University Press, 2021.
2. Joshua D. Angrist and Jörn-Steffen Pischke, Mostly Harmless Econometrics- An Empiricist’s Companion, Princeton University Press, 2009.
3. Jeffrey M. Wooldridge, Introductory Econometrics- A Modern Approach, 6th Edition, Cengage Learning, 2016
4. Jeff Wooldridge, Econometric Analysis of cross section and panel data, MIT press, 2002
5. R. Carter Hill, William E. Griffiths and Guay C. Lim, Principles of Econometrics, 5th Edition, Wiley, 2018.
6. Brooks, C., Introductory Econometrics for Finance. Cambridge university press, 2014.
7. Matt Taddy, Leslie Hendrix, Matthew Harding (2022) “Modern Business Analytics” McGraw Hill; 1st edition
8. James, G., D. Witten, T. Hastie, and R. Tibshirani. (2021). “An Introduction to Statistical Learning: with Applications in R”, Springer. (2nd ed.)



## Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-2	In this introductory topic students will be introduced to the subject. The motivation for learning computational economics across various fields will be discussed.	Introduction to Computational Economics	Class Notes
3-6	Upon completing this module, students can understand uncertainty in terms of probability and statistics and quantify the same.	Uncertainty Quantification	Chapter 1 (TB) and Class Notes
7-12	After completing the module, students will learn the fundamental structure and concepts used in regression analysis.	Regression	Chapter 2 (TB) and Class Notes
13-18	After completion of the module, students will be able to master the essential tools for high-dimensional modelling	Regularization and Selection	Chapter 3 (TB) and Class Notes
19-21	At the end of the module, students will learn how to deal with classification questions in the context of prediction problems	Classification	Chapter 4 (TB) and Class Notes
22-27	Students can distinguish between correlation and causation in analyzing business and economic systems after completing the module and will be able to carry out casual analysis by creating counterfactuals using experimental designs.	Causal Inference in Experimental Designs [Randomized Controlled Trial]	Chapter 5 (TB) and Class Notes
28-40	At the end of the module, students will be able to carry out causal analysis using counterfactual using non-experimental designs.	Causal Inference with Nonexperimental Designs [Difference-in-Differences Estimates, Propensity Score Matching, Regression Discontinuity Design, Interrupted Time Series & Instrumental Variables]	Chapter 6 (TB) and Class Notes

**Evaluation Scheme:**

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Assignment-I	-	10	TBA	OB
Quiz-I	TBA	5	TBA	CB
Mid-Semester Exam	90 min.	30	13/10 - 4.00 - 5.30PM	CB
Assignment-II	-	10	TBA	OB
Quiz-II	TBA	5	TBA	CB
Comprehensive Exam	3 hrs.	40	19/12 AN	CB

**Chamber Consultation Hour:** To be announced in the class.

**Notices:** All notices pertaining to this course shall be displayed on the **Economics and Finance (or) CMS Notice Board**.

**Make-up Policy:** Make-up will be granted only on genuine grounds and if prior permission is taken. Make-up application via sms/ messages is not acceptable; only communication through official email will be entertained.

**Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**INSTRUCTOR-IN-CHARGE**  
**ECON F215**

