|                               | ECO220: Econometrics   |  |  |  |
|-------------------------------|--|--|--|--|
| Faculty: Moumita Roy          | Contact: moumita.roy@ahduni.edu.in   | Office<br>hours and<br>location:                                   | Wed: 2:30 - 4:00 p.m.<br>School of Arts and<br>Sciences, Central<br>Campus, Room M-103 |  |
| School                        | Amrut Mody School of Management  | <u> </u>   | 1.   |  |
| Semester                      | Monsoon  | Credits  | 3  |  |
| Lecture Days; Time            | Tues & Thurs: 11:00 – 12:30 a.m.   | Location   | School of Arts and Sciences, Central Campus, Room-204, Second Floor                    |  |
| Pre-requisites                | STA101 Introductory Statistics.  |  |  |  |
|                               | Students should have a basic knowledge of probability, statistics, and algebra.  |  |  |  |
| Anti-requisite                | None   |  |  |  |
| Course Description            | This course introduces students to the modern econometric techniques used to conduct empirical analysis in Economics. The course is designed to provide the students with the basic quantitative techniques needed to undertake applied research projects. Students will be introduced to both theoretical and applied econometrics so that by the end of this course, they can apply the formal theories they learn to analyse complex real-world problems. Students will also need to use an econometric software package, STATA, and different datasets in this course. This will enable them to learn and explore multiple estimation and forecasting techniques. Finally, the course also provides the base for more advanced optional courses in econometrics. |  |  |  |
| Course Objectives             | This course aims to provide an overview of various econometric methods. The focus is on understanding econometric theories and the underlying assumptions on the one hand, and application of econometric techniques on empirical data on the other.  Broadly, we will cover topics including simple regression models, multiple regression models, panel data analysis and time series data analysis.   |  |  |  |
| Pedagogy                      | Students will be expected to read the required chapters and the articles before class.  Each class will be interactive with students solving problems and answering questions in class. Students do not need to buy any software packages. It will be provided to them.  Students will need to bring their devices to class in the sessions when STATA is being taught. Students will be informed about these particular sessions in advance.  |  |  |  |
| Learning Outcomes             | 1. Have a clear understanding of basic applied econometric methods and apply them to address real world issues.  |  |  |  |
|                               | <ol> <li>Be able to analyse different economic datasets using STATA.</li> <li>Be able to estimate econometric models and use them for simple forecasting exercises.</li> </ol>   |  |  |  |
| Expectations from<br>Students | All the material in this class is copyrighted. Fallides, with students outside of this class. St fundamental and rather simple principles: (2) when using the work or ideas of others, inclaccurate citations; and (3) if you are uncertaged.  | udents will be requ<br>1) all work submitte<br>uding fellow studer | ired to always follow three ed should be your own; (2) nts, give full credit through   |  |

|                         | assignment, ask for clarification. Students are expected to follow the University's code of conduct and maintain academic honesty and integrity.  Over and above this, students are required to come to class on time. Students are expected to read the prescribed material prior to class and participate in the class discussion.   |
|-------------------------|--|
| Assessment / Evaluation | <ul> <li>Quizzes (30%): There will be an in-class quiz every alternate week till the week before the final exam.</li> <li>Problem Sets (20%): There will be 2 problem sets given during the duration of the course. The problem sets must be submitted to me on the day it is due. No late submissions will be accepted.</li> <li>End Semester Exam (30%): The final exam is <i>comprehensive</i>. Anything that will be taught in the course is potential material for the final exam.</li> <li>Project (20%): You will have to submit a group project (3/4 students) using the theories and tools of econometrics (that you learnt in the course). The project submissions will be in 2 parts: midterm submission (5%) and final submission (15%). More details about the project will be given during the course lectures.</li> </ul> |
| Attendance Policy       | Students are required to attend all the classes (100% attendance) and the Ahmedabad University attendance policy of grade drop would be applicable to students who have less than 80% attendance.  |
| Course Material         | <ul> <li>Econometric Analysis, Greene, William H., 8<sup>th</sup> Edition, Pearson Education<br/>Publication, 2018</li> </ul>  |
| References              | <ul> <li>Basic Econometrics, Gujarati, Damodar N, Porter, Dawn C., and Gunasekar Sangeetha, 5<sup>th</sup> Edition, McGraw Hill Publication, 2017</li> <li>Introduction to Econometrics, Maddala, G.S., and Lahiri, Kajal, 4<sup>th</sup> Edition, Wiley Publications, 2012</li> </ul>   |
|                         | Additional readings if required will be made available during lectures.  |

| Sessio<br>n | Topic Title                       | Topic and subtopic details  | Readings  | Important Dates |
|-------------|-----------------------------------|---|---|-----------------|
| 1           | Course<br>Introduction            | Introduction to economic and econometric modelling  | Greene 1,<br>Chapter 1<br>Maddala and<br>Lahiri, Chapter 1                  |                 |
| 3           | Simple Linear<br>Regression Model | Regression terminologies, specification of the relationship, two-variable linear regression model CLRM, OLS estimation, properties of least square estimators | Gujarati, Porter<br>and Gunasekar,<br>Chapter 1-4<br>Greene, Chapter<br>2-5 | Quiz 1          |

| 5  | Inference and<br>Prediction   | Hypothesis testing; linear and non-linear restrictions, Forecasting | Gujarati, Porter<br>and Gunasekar,<br>Chapter 5  |                                     |
|----|---|---|--|-------------------------------------|
|    |   |   | Greene, Chapter                                  |                                     |
| 7  | Extensions of<br>Simple Regression  | Non-linearity in variables, extension of two-variable               | Gujarati, Porter and Gunasekar,                  | Quiz 2                              |
| 8  | Model   | linear regression model   | Chapter 6  |                                     |
|    |   |   | Greene, Chapter<br>9                             |                                     |
| 9  | Multiple Linear<br>Regression Model                                       | Model with two explanatory variables                                | Gujarati, Porter and Gunasekar, Chapter 7, 8     |                                     |
| 10 |   |   | Maddala and<br>Lahiri, Chapter 4                 |                                     |
| 11 |   |   |  | Quiz 3,                             |
|    |   |   |  | Problem Set 1 assigned              |
| 12 | STATA practice<br>session, Discussion<br>of midterm project<br>submission |   |  |                                     |
| 13 | Violations of classical assumption:                                       | OLS estimation, testing for heteroskedasticity, solutions to        | Greene, Chapter<br>11                            |                                     |
| 14 | Heteroskedasticity  | heteroskedasticity, ARCH, GARCH                                     | Gujarati, Porter<br>and Gunasekar,<br>Chapter 11 |                                     |
| 15 | Violations of classical assumption:                                       | Testing for autocorrelation, forecasting in the                     | Greene, Chapter                                  | Quiz 4 Project submission (Midterm) |
| 16 | Autocorrelation   | presence of autocorrelation, AR (1) disturbances                    | Gujarati, Porter<br>and Gunasekar,<br>Chapter 12 | Problem Set 1 due                   |
| 17 | Violations of classical assumption:                                       | Measures, problems with measuring multicollinearity, solutions      | Gujarati, Porter<br>and Gunasekar,<br>Chapter 10 |                                     |
| 18 | Multicollinearity   | to the multicollinearity problem                                    | Maddala and<br>Lahiri, Chapter 7                 |                                     |

| 19 | Dummy Variables                | ANOVA models with qualitative variables,                              | Greene, Chapter<br>7  | Quiz 5                        |
|----|--------------------------------|---|---|-------------------------------|
| 20 |                                | interaction effects using dummy variables                             | Gujarati, Porter<br>and Gunasekar,<br>Chapter 9                           |                               |
| 21 | STATA practice session         |   |   |                               |
| 22 | Panel Data Models              | Fixed effects, random effects, instrumental                           | Greene, Chapter<br>13   |                               |
| 23 |                                | variables, dynamic panel<br>data models                               | Gujarati, Porter<br>and Gunasekar,  | Quiz 6 Problem Set 2          |
| 24 |                                |   | Chapter 16  | assigned                      |
| 25 | Discrete Choice<br>Models      | Linear probability model, logit model, probit model.                  | Greene, Chapter 21 Gujarati, Porter                                       |                               |
| 26 |                                |   | and Gunasekar,<br>Chapter 15  | Problem Set 2 due             |
| 27 | Time Series Model              | Stationary stochastic processes, Non-stationary processes, unit roots | Greene, Chapter<br>20<br>Gujarati, Porter<br>and Gunasekar,<br>Chapter 21 | Project Submission<br>(final) |
| 28 | Reflections/Revie<br>w Session | Entire course   |   |                               |
| 29 | Reflections/Revie<br>w Session | Entire course   |   |                               |
| 30 | End semester<br>Examination    | Entire course   |   |                               |