1. It was decided that for the academic session 2021-22, the main textbook would be Basic Econometrics, Sixth edition by Gujarati, Porter and Pal (2021) supplemented by Wooldridge(2014) for selected topics. For applications using software, Econometrics by Example by Gujarati (2014) would be the recommended text.

2. The Matrix Approach to Linear Regression Model, i.e. Section II.1 can also be covered from Appendix C in Gujarati, Porter and Pal (2021), 6th edition.
3. Teachers are advised to use the following textbooks for reference in the Applied Econometrics course in the BA(Hons) Semester batch of 2021-22:

   These books can be used as reference books for any topic but they are particularly recommended for topics IV and V.

4. The Applied Econometrics course must orient students to do a research project and get hands on experience with appropriate software (GRETL/EViews/ R/Stata/EXCEL etc). This would form part of the Internal Assessment.

   The details of the Syllabus, Topic-wise Reading list, recommended text books and Student Assessment summary are attached.
SYLLABUS

I. Stages in Empirical Econometric Research

II. The Linear Regression Model: Estimation, Specification and Diagnostic Testing
   i. The Matrix Approach to Linear Regression Model: The k- variable regression model,
      Assumptions of the Classical Linear Regression Model, OLS estimation, Variance-
      Covariance Matrix, Coefficient of Determination $R^2$.
   ii. Review of Functional forms and Qualitative explanatory variable regression models
   iii. Regression Diagnostics
      a. Detection of and remedial measures for Multicollinearity, Autocorrelation and
         Heteroscedasticity.
      b. Model Selection and Diagnostic Testing
         1. Tests of Specification errors: Detecting the presence of unnecessary variables,
            omitted variables and incorrect functional form ( Ramsey RESET and
            Lagrange Multiplier Test for Adding Variables)
         2. Errors of measurement: Consequences and remedial measures
         3. Model Selection Criteria: $R^2$ and Adjusted $R^2$ criteria, Akaike’s Information
            Criterion and Schwarz’s Information Criterion.
         4. Additional topics in modelling (Outliers, Leverage, Influence; Recursive least
            Squares; Chow’s Prediction Failure Test; Missing Data)
         5. Non-normal errors and stochastic regressors

III. Advanced Topics in Regression Analysis
   i. Dynamic Econometric Models
      a. Distributed Lag Models: Nature of lagged phenomena, Estimation using Koyck
         transformation (The Adaptive Expectations and Partial Adjustment
         Models)
      b. Estimation of Autoregressive Models
   ii. Instrumental Variable Estimation
      a. Omitted variables in a simple regression model
      b. Measurement errors

IV. Panel Data Models and Estimation techniques
   The Pooled OLS Regression Model, the Fixed Effect Least Squares Dummy Variable Model,
   the Fixed Effect within Group Estimator, the Random Effects Model.

V. Limited Dependent Variable
Logit and Probit Models for Binary Response, Tobit Model

VI. Introduction to Econometric Software (GRETL/ EViews/ R /Stata/ EXCEL: ANY ONE)
   i. Generation of data sets and data transformation; data analysis (Graphs and Plots, Summary Statistics, Correlation Matrix etc.)
   ii. Running an OLS regression; Testing for Linear Restrictions and Parameter Stability.
   iii. Regression Diagnostics: Collinearity, Autocorrelation, Heteroscedasticity, Normality of residuals
   iv. Estimation of Other Linear Models: Weighted Least squares, Cochran-Orcutt/ Hildreth-Lu/ Prais-Winsten etc.
   v. Model Selection Criteria (AIC, SIC) and Tests (Adding and Omitting Variables, Non Linearities: Squares, Cubes and Logs, Ramsey’s RESET test)
### Topic-wise reading list

<table>
<thead>
<tr>
<th>S.No.</th>
<th>TOPIC</th>
<th>REFERENCES FROM RECOMMENDED TEXT BOOKS</th>
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| II.ii. | Review of Functional forms and Qualitative explanatory variable regression models | • *Chapter 2 ‘Functional Forms of Regression Models’*  
• *Chapter 3 ‘Qualitative Explanatory Variables Regression Models in Gujarati, Econometrics by Example.* |
| II.iii.a | Regression Diagnostics: Detection of, and remedial measures for Multicollinearity, Autocorrelation Heteroscedasticity | • *Chapter 4 ‘Regression Diagnostic I: Multicollinearity’,*  
• *Chapter 5 ‘Regression Diagnostic II: Heteroscedasticity’*  
• *Chapter 6 ‘Regression Diagnostic III: Autocorrelation in Gujarati, Econometrics By Example* |
• *Chapter 9.5 ‘More on Specification and Data issues’, Section 9.5 in Wooldridge, Introductory Econometrics.*  
• *Chapter 7 ‘Regression diagnostic IV: model specification errors’, Section 7.1-7.8 in Gujarati, Econometrics By Example* |
|--------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
• Chapter 18 ‘Simultaneous Equation Models’ in Gujarati, Porter and Pal, Basic Econometrics. |
| IV.    | Panel Data Models and Estimation Techniques | • Chapter 16 ‘Panel Data Regression Models’ in Gujarati, Porter and Pal, Basic Econometrics |
| V.     | Limited Dependent Variable | • Chapter 15 ‘Qualitative Response Regression Models’ in Gujarati, Porter and Pal, Basic Econometrics. (except 15.12 and 15.13). Appendix 15A is to be done. |
• Relevant Instruction Manual for the Software |

**Recommended textbooks**

**Student Assessment Summary**

Students will have to pass the end-semester exam and the total of the internal assessment and end-semester exam as per university rules to clear the paper.

The end-semester final examination will be of 75 marks. The question paper will consist of seven questions of 15 marks each from Topics I, II, III, IV and V only. Students will have to answer any five questions.

The software skills of the students will be tested by the teachers during internal assessment and not in the end-semester final exam. The paper setting committee should take a note of this.

Internal assessment will be of 25 marks, divided further as follows:

1. Attendance: 5 marks
2. Class Test/ Assignment: 10 marks
3. Empirical project using the econometric software learnt: 10 marks. (Projects can be done in groups of 2 or 3)

Note:
- In view of the pandemic the criteria for grading may be as per the university norms.
- Applied Econometrics paper should be attempted by the students on the first day of electives as it is decided alphabetically.