



Full Name : \_\_\_\_\_ Student ID: \_\_\_\_\_

Grade Table (for Lecturer use only)

Question	Points	Score
1	20	
2	50	
3	30	
Total:	100	

Instructions for Final Exam

Welcome to the final exam of EEE483 - Introduction to Energy Analytics (I2EA) and good luck!

Please read the following rules and confirm by signing that you have read and understood the rules before you receive your exam:

- The final exam should be conducted between 09:15 and 12:00. Exam duration is 165 minutes. Students must finalise the exam by delivering it before 12:00. Students are not allowed to leave the exam in the first 30 minutes.
- Student ID cards should visibly be on the edge of desks till the end of the exam. Students without the student ID cards or Turkish identity cards should not be participated into the exam.
- This is a closed-book exam which means that students are not allowed to take notes, books, or any other reference material into the exam. Throughout the exam, students should not possess mobile phones and electronic devices that are capable of storing, receiving or transmitting information or electronic signals, such as computerised watches.
- Students are not allowed to take a glance at the exam questions until told to do so. Students should not communicate with any other student under any circumstances during the exam period. A student, who cheats, tries to cheat during the exam, or is identified to be cheating after investigating exam documents, is given 0 (zero) for that exam and a disciplinary investigation is opened against the student.
- An incorrect answer to a question is awarded no marks with no consideration of any partial credit. Therefore, no partial credit will be given.

In recognition of and in the spirit of the above rules which constitute Adana Alparslan Türkeş Science and Technology University Honour Code, I certify that I will neither give nor receive unpermitted aid on this examination.

Signature: \_\_\_\_\_



1. (a) **(5 points)** Why did you select EEE483-Introduction to Energy Analytics course at the beginning of this term? Do you recommend this course for senior undergraduate students in our department and why?

- (b) **(5 points)** Should Julia, MatLab, Python, or R be the main programming language of this course and why?



- (c) **(10 points)** How can we improve this course? Please criticise the deficiencies and make suggestions to improve this course.



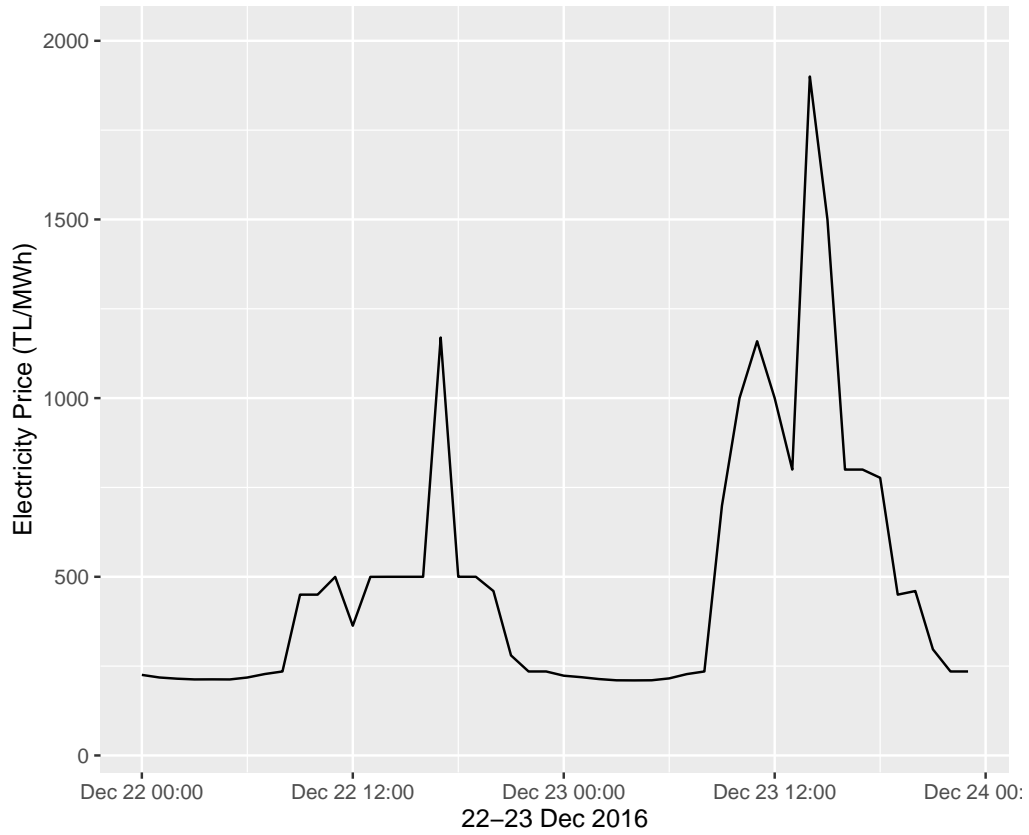
2. Download the file named as “PTF-01012016-31122019.csv” in “Electricity Prices of Turkey” data set from Kaggle data sets and answer the following questions by using the downloaded file along with emphasising R codes.

(a) **(10 points)** Write down R codes to import “PTF-01012016-31122019.csv” into RStudio as a tibble named as price by using read\_delim() function.

(b) **(10 points)** Check the values in PTF (TL/MWh) column with row numbers 8562, 8580, 8583, and 8584, and report anything wrong. If there is something wrong, explain how you can handle this problem.



- (c) (15 points) Write down R codes to make required data manipulation in order to plot a similar graph shown below.





(d) (15 points) Write down R codes to make required data manipulation in order to plot a correlation map with Spearman correlation and fill the below table.

<b>Spearman Correlation</b>	<b>PTF (TL/MWh)</b>
PTF (USD/MWh)	
PTF (EUR/MWh)	
Year	
Month	
Day of Month	
Day of Week	
Hour of Day	



3. (30 points) *Please note that if you put a check mark on “I would prefer to use my PRESENTATION score instead of solving this question”, then your presentation score will be accepted, otherwise your answers to the question will be evaluated.*

**I would prefer to use my PRESENTATION score instead of solving this question.**

Download the files named as “london.energy.csv” in “London Energy Data” data set and “london.weather.csv” in “London Weather Data” data set from Kaggle data sets, use both data sets for day-ahead electrical energy consumption forecasting of households with unique IDs of MAC001040, MAC001071, MAC001299, and MAC001453 by using multiple linear regression (MLR) method, calculate coefficient of determination (R-squared), mean absolute error (MAE), and mean absolute percentage error (MAPE), and compare the results of each household with others along with emphasising R codes from the beginning to the end.

Household Unique ID	R <sup>2</sup> (%)	MAE (kWh)	MAPE (%)
MAC001040			
MAC001071			
MAC001299			
MAC001453			