Course Project Control Systems (Weightage: 25 Marks absolute)

Q: Fuel Cell is an electrochemical device that converts chemical energy into electrical energy through redox reactions. More details regarding fuel cells can be seen at website of FCHEA (Fuel Cell and Hydrogen Energy Association) **[1]**. There are various types of fuel cells. These include Proton Exchange Membrane Fuel Cells (PEMFC), Solid Oxide Fuel Cells (SOFC), Alkaline Fuel Cells (AFC), etc. Information regarding different types of fuel cells can also be found at **[2]**. Your task is to model any of the type of fuel cell in Matlab using SIMULINK. Following are the deliverables:

a) A working SIMULINK model to calculate the response of your cell against different types of input.
b) A thorough analysis of the system response.
c) Integration of some system to produce power, utility, etc. for Waste Heat Recovery of the fuel cell.
d) The designed system should bear novelty
e) Summarize your findings and result in the form of a paper (6000-7000 words) supported by a thorough literature review including more than 30 standard references cited in a proper style using Zotero software.
f) There is zero tolerance policy for plagiarism. Any plagiarized work will be awarded zero marks straightaway.

Resources

Following resources or similar can help you to develop an idea regarding project.

a) https://www.youtube.com/watch?v=iOmqgewj5XI [For Simulink]
b) https://ieeexplore.ieee.org/document/6151480
c) https://www.mathworks.com/help/physmod/sps/examples/solid-oxide-fuel-cell-connected-to-three-phase-electrical-power-system.html
d) https://www.hindawi.com/journals/jac/2016/2684919/
e) https://www.mdpi.com/1996-1073/12/19/3686/htm
f) https://www.researchgate.net/publication/331623893_Performance_and_Efficiency_Analysis_of_an_HT-PEMFC_System_with_an_Absorption_Chiller_for_Tri-Generation_Applications

References:

[1] http://fchea.org/fuelcells

[2] http://www.fuelcelltoday.com

Deadline:

The deadline to submit your project is Friday 20th December 2019. Your submission must be in hardcopy and softcopy.