



INDIVIDUAL ASSIGNMENT

EE038-3-2-ESA

ENGINEERING SOFTWARE AND APPLICATIONS

APU2F2309CE/EE/ME/PE/TE

HAND OUT DATE: 6 NOVEMBER 2023

HAND IN DATE: 1 DECEMBER 2023

WEIGHTAGE: 50%

INSTRUCTIONS TO CANDIDATES:

- 1. Submit your assignment on Moodle.**
- 2. Late submissions will be awarded zero (0) unless Extenuating Circumstances are upheld.**
- 3. Underpin your answers with the use of references (cited using the APA Referencing).**
- 4. Cases of plagiarism will be penalized.**
- 5. You must obtain 50% overall to pass this module.**

MODULE DESCRIPTOR VERSION: VE2		
No.	Course Learning Outcomes	Assessments
1	Apply software simulation to address engineering problems. (C3, PLO2)	Individual Assignment
2	Outline software-based solutions for real-world engineering problems. (C4, PLO2)	Individual Assignment

Assignment Task No.		Question Vs Taxonomy																	
		Cognitive Level						Psychomotor Level							Affective Level				
		1	2	3	4	5	6	1	2	3	4	5	6	7	1	2	3	4	5
CLO1	1			50m															
	POM			50%															
CLO2	2				50m														
	POM				50%														

Task Description

University XYZ would like to develop an educational software which has the ability to simulate the performance of basic power converter circuits such as half wave rectifier and full wave rectifier. As an engineer in University XYZ, design and develop the software using MATLAB.

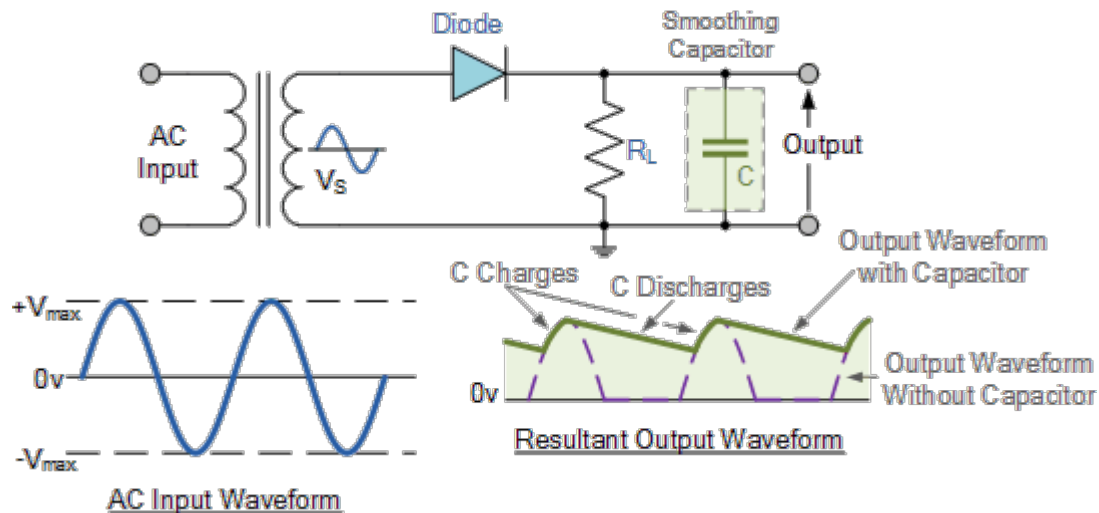


Figure 1: Half wave rectifier and its performance.

Outline (CLO1-C3-PLO2) a Graphical-User-Interface (GUI) using GUIDE or AppDesigner with appropriate design that is able to create the Power Converter simulator. Your GUI should be able to receive user input to set parameters and display the output accordingly. Please include at least one (1) innovative idea inside your program.

Produce (CLO2-C4-PLO2) a report with the detail of the constructed GUI. Your report shall include

1. Design and flow of the program: You should produce a flowchart (or multiple flowcharts) to explain your flow of your program.
2. Format and style of the program: You should explain the coding you have produced with brief description.
3. Brief description on introduction, results, discussion and conclusion.

Additional note:

You may want to consider the following features to be included in your GUI:

1. User is able to select which type of power converter circuit to be simulated in a drop down list.
2. User is able to key in the input voltage value and the frequency.
3. User is able to enable and disable the effect of capacitor to see the smoothing performance.
4. User is able to know the voltage ripple peak to peak value.
5. User is able to view the plot of the output voltage at any stage from (2) to (4) by clicking the simulation button.

6. Your system should be able to perform error checking routine for invalid entries by users.
7. You may enhance the appearance of the GUI by inserting pictures and changing the properties of the UI-objects contained in the GUI.
8. Kindly provide at least one (1) logical innovative idea and justify it in the report.

Note:

During the Q&A session, you will be asked to present the work done to the module lecturer and display the results through the GUI developed within 15 mins.

Additional Information:

In this assignment, you are required to compile a technical report according to the guideline in Appendix A (minimum 15 pages but not exceeding 30 pages excluding appendix). Kindly note the following:

1. Build your software routines based on the objectives; clearly label your routines with comments to aid understanding.
2. Organise your software routines in a proper formatting, devoid of syntax errors and fully executable.
3. Perform the software routine in matrix-processing operation is to be an advantage.
4. Submit the required software routines electronically as well as in text-based form.
5. Plagiarism of software codes will be penalized.

Assessment Criteria:

- | | |
|---|-------|
| 1. Report should include the following: | (70%) |
| • Introduction | 5% |
| • Design and flow of routines | 20% |
| • Format and style of routines | 20% |
| • Result and analysis | 15% |
| • Discussion (Refer to Appendix B) | 5% |
| • Conclusion (Refer to Appendix B) | 5% |
| 2. Tutor assessment | (30%) |
| • Demonstration | 15% |
| • Q & A | 15% |

Grading Criteria:

Grading criteria is enclosed in Appendix C

APPENDIX A

General requirement on Report

- The report must be formatted with a font size of 12pt if Times New Roman or a font size of 11pt if Arial and 1.5 line spacing. Please ensure the paragraphs are properly aligned/justified.
- There should be List of Tables and List of Figures after the Table of Content.
- The report should be in chapters and the structure should not go beyond the second level. Instead of adding subsections at the third level you may use bullets if required.
- All information provided must be straight to the point, precise and all information must be cited accordingly and well presented. Avoid plagiarism.
- All figures and tables must have a title and referenced i.e. indicate the source.
- The report must be in binding.
- Please also include the following in you report
 - Page numbering at each page (Page X of Y)
 - Figure and table caption font size : Times New Roman,10 pt
 - Position of figure and table: centre-aligned.

Appendix B

Instructions to Students about Discussion, Conclusion and Reference

Discussion

In the Discussion section you should give an overall appraisal of the results of your work. It is here that you will have the best opportunity to demonstrate your understanding of the work and to give a critical account of what challenges you were facing and your solution to these challenges for the assignment completion.

Conclusion

The Conclusion is a short summary of the results of your work (about 200 words) and suggestion on possible further improvements. The Conclusion should follow naturally from the Discussion. It should give a concise statement of what has been achieved. Anticipated application of techniques developed should be summarized very briefly. The Conclusion should be self-contained, i.e., it should not make reference to any sections, figures, or references in the report.

References

All references to books, papers, and other publications must be fully and correctly quoted to be useful to the reader. Please refer to the APA Referencing Guide document in APU Library Homepage for guidance on referencing and citation.

Citation Example

In the text

The analysis of the varactor diode multiplier has been extensively reviewed by Scanlan (1989) and will....

In the References section

Scanlan, J O (1989). Analysis of Varactor Harmonic Generators, *Bell Systems Technical Journal*, 44, 75-92.

APPENDIX C – Grading Criteria

Name :

TP Number :

Marks:

Grade:

Criteria	Fail	Marginal Fail	Pass	Credit	Distinction
Demonstration of understanding to the subject question in Introduction (5 Marks) [CLO1-PLO2-C3]	0 – 1 Produced a very poor introduction about the given complex engineering problem. No presence of understanding.	2 Produced a poor introduction about the given complex engineering problem and with little understanding.	3 Produced a brief introduction about the given complex engineering problem and with moderate understanding.	4 Produced a good introduction about the given complex engineering problem and with sufficient understanding.	5 Produced an excellent introduction about the given complex engineering problem and with precise understanding.
Design and flow of routines (20 Marks) [CLO1-PLO2-C3]	0 – 7 Produced very poor or no illustration of flow-charts to demonstrate the problem-solving using engineering principles.	8 – 9 Produced poor and partial illustration of flow-charts to demonstrate the problem-solving using engineering principles.	10 – 12 Produced basic illustration of flow-charts to demonstrate the problem-solving using engineering principles.	13 – 14 Produced good and concise illustration of flow-charts to demonstrate the problem-solving using engineering principles.	15 – 20 Produced excellent and elaborative illustration of flow-charts to demonstrate the problem-solving using engineering principles.
Format and style of routines (20 Marks) [CLO1-PLO2-C3]	0 – 7 Produced very poor or no implementation of software routines and no inclusion of comments.	8 – 9 Produced poor implementation of software routines and poor inclusion of comments.	10 – 12 Produced basic implementation of software routines but do not take advantage of matrix-processing capability of the software. Basic inclusion of comments.	13 – 14 Produced good implementation of software routines; clearly demonstrate the matrix-processing capability of software in written routines. Concise inclusion of comments.	15 – 20 Produced excellent implementation of software routines; clearly demonstrate the ability to write simple but precise software routines with inclusion of matrix-processing capability. Concise inclusion of comments.
Result and analysis (15 Marks) [CLO2-PLO2-C4]	0 – 3 Outlined irrelevant or no simulation results.	4 – 6 Outlined wrong simulation results with no analysis of the given complex engineering problem.	7 – 9 Outlined partially correct simulation results and weak analysis of the given complex engineering problem.	10 – 12 Outlined correct simulation results and with good analysis of the given complex engineering problem.	13 – 15 Outlined correct simulation results and with excellent analysis of the given complex engineering problem.
Discussion (5 Marks) [CLO2-PLO2-C4]	0 – 1 Outlined very poor or no discussion on the work done and	2 Outlined poor discussion on the performance of the work done and implementation using the software.	3 Outlined basic discussion on the performance of the work done and implementation using the software.	4 Outlined good discussion on the performance of the work done and	5 Outlined excellent discussion on the performance of the work

	implementation using the software.			implementation using the software.	done and implementation using the software.
	0 – 1	2	3	4	5
Conclusion (5 Marks) [CLO1-PLO2-C3]	Produced very poor or no conclusion of the work done and further improvement suggestions.	Produced poor conclusion of the evaluation for the work done using the software and no further improvement suggestions.	Produced basic conclusion of the evaluation for the work done using the software and further improvement suggestions.	Produced good conclusion of the evaluation for the work done using the software and further improvement suggestions.	Produced excellent conclusion of the evaluation for the work done using the software and further improvement suggestions.
Tutor Assessment (30 Marks) [CLO2-PLO2-C4]	Demonstration (15 Marks)	0 – 3	4 – 6	7 – 9	10 – 12
		Outlined very poor demonstration or did not turn up for the demonstration.	Outlined poor demonstration and was barely able to explain what was done in the assignment.	Outlined basic demonstration and was able to explain sufficiently what was done in the assignment.	Outlined good demonstration and was able to explain clearly and in details what was done in the assignment.
	Q & A (15 Marks)	0 – 3	4 – 6	7 – 9	10 – 12
		Outlined very poor competency or did not turn up for the Q&A.	Outlined poor competency in complex engineering problem-solving and analysis.	Outlined basic competency in complex engineering problem-solving and analysis.	Outlined good competency in complex engineering problem-solving and analysis.
					Outlined excellent competency in complex engineering problem-solving and analysis.

Marked by Ir Eur Ing Ts Dr Lau Chee Yong