Computational Methods in Physics (PHY4605) - **Mini Project**

Table of Contents

General Instructions

1. This mini project constitutes 10% of your final grade, and it involves working in a group of three.
2. Each group has been assigned a specific topic corresponding to a chapter in the book One Hundred Physics Visualizations Using MATLAB - Dan Green (2013).
3. In your assigned chapter, you are required to select one subchapter that includes a physics simulation.
4. Your task is to thoroughly review the text and examine the associated code files related to the simulation.
5. Your ultimate goal is to document and present the simulation described in your chosen subchapter.
6. You must submit your documentation (MATLAB Live Script) and presentation video by the conclusion of Week 14 on PutraBLAST.
7. If you encounter any uncertainties or have questions, please first revisit the provided instructions. If your inquiries persist, do not hesitate to seek clarification from the lecturer.

Documenting the Simulation

1. When documenting a MATLAB simulation, it is crucial to reference the **text in the book**, the **associated code file(s)**, and **external source**s while creating a **Live Script** file based on the provided template.
2. The Live Script should encompass a blend of **code, explanatory text, and relevant figures**, with the text being entirely original and not plagiarized from any sources, including the textbook, while also avoiding AI-generated content.
3. The document's word count, excluding code, should fall within the range of **800 to 1000 words**.
4. Each figure included in the Live Script must be accompanied by a **caption** and a **source citation**. To ensure transparency and reliability, these sources must be **hyperlinked** to the original material or webpage.

5. To enhance the readability of the code, it is essential to employ descriptive variable names, insert helpful comments, and adhere to sound programming principles.
6. The code can be divided into sections, allowing for descriptive text to be interspersed.
7. While not mandatory, the use of other Live Editor components like **Live Control** and **Live Task** is recommended to enhance code interactivity.
8. It is imperative to validate all functions used in the code to ensure compatibility with the most recent MATLAB version. If any functions have been discontinued, they must be substituted with updated equivalents.
9. The documentation should explicitly specify the required toolboxes needed to execute the code.
10. The evaluation of this documentation will be based on the following criteria: (i) contents and clarity (30 points), (ii) originality (20 points), (iii) quality of code (20 points), and (iv) language and format (10 points). The evaluation rubric is detailed in the Appendix.

Presenting the Simulation (Video)

1. Prepare a video with a duration between **12 to 15 minutes**, showcasing your MATLAB simulation. The video should be a continuous, clear presentation that demonstrates and explains your work effectively.
2. **All group members must participate as speakers in the video, with each member's face appearing at least once.**
3. Use the Live Script you prepared as the foundation of your presentation. Include this as the main reference point in the video, but you may edit the script to highlight specific sections if needed for clarity.
4. Incorporate additional materials, such as **slides, annotated visuals, or recorded screen demonstrations** to enhance comprehension. You are encouraged to add **flowcharts** to clarify the logical flow and any key theory underlying your code.
5. Focus on simplifying complex theories to make them easily understandable. Provide clear, concise explanations and avoid overly technical jargon to keep the audience engaged.
6. Ensure that your explanation follows the logical flow of your code, segmenting the video by topics or sections if it helps maintain clarity.
7. Show the **execution of code sections**, explaining each part sequentially. Aim to make your walkthrough intuitive by emphasizing how each part contributes to the overall simulation.
8. The evaluation of your presentation will be based on the following criteria: (i) contents and clarity (30 points), (ii) enthusiasm and technical (20 points), (iii) understanding (20 points), and (iv) teamwork (10 points). The evaluation rubric is detailed in the Appendix.

Appendix: Evaluation Rubrics

Documentation of the Simulation

Aspect	Inadequate (0% - 24%)	Satisfactory (25% - 49%	Good (50% - 74%)	Excellent (75 - 100%)
Contents & clarity (30 points)	Incomplete or inaccurate explanation of theories and concepts. No relevant equations or graphics.	Partial explanation of theories and concepts with inaccuracies. Limited use of equations and graphics.	Adequate explanation of theories and concepts with minor inaccuracies. Use of some relevant equations and graphics.	Comprehensive and accurate explanation of theories and concepts. Effective use of equations and graphics for reader understanding.
Originality (20 points)	High similarity rate (over 30%) according to Turnitin for both plagiarism and AI-generation.	Moderate similarity rate (between 20-30%) according to Turnitin for both plagiarism and AI-generation.	Low similarity rate (between 10-20%) according to Turnitin for both plagiarism and AI-generation.	Very low similarity rate (below 10%) according to Turnitin for both plagiarism and AI-generation.
Quality of code (20 points)	Poor readability, lack of descriptive variables and comments, outdated code. No interactive components.	Limited readability, use of some descriptive variables and comments, outdated code. Minimal interactive components.	Good readability, use of descriptive variables and comments, code updated for compatibility with the latest MATLAB version. Some interactive components.	Excellent readability, extensive use of descriptive variables and comments, code updated for compatibility, and significant use of interactive components for enhanced user experience.
Language & format (10 points)	Language is not suitable for an undergraduate level audience, contains multiple grammatical errors, and does not follow the provided template.	Language is somewhat suitable for an undergraduate level audience but still contains notable grammatical errors. Some adherence to the provided template.	Language is suitable for an undergraduate level audience with minimal grammatical errors. Adherence to the provided template with minor deviations.	Language is highly suitable for an undergraduate level audience, nearly free from grammatical errors, and closely follows the provided template.

Presentation of the Simulation

Aspect	Inadequate (0% - 24%)	Satisfactory (25% - 49%	Good (50% - 74%)	Excellent (75 - 100%)

Contents & clarity (30 points)	Presentation is ineffective in conveying theories; lacks clarity and structure; limited or no use of supplementary visuals to aid understanding.	Presentation partially conveys theories with some inaccuracies; clarity is inconsistent, and some visuals are used, though they do not fully support comprehension.	Presentation mostly conveys theories accurately with minor inaccuracies; generally clear and supported by relevant visuals that aid audience comprehension.	Presentation is highly effective, conveying accurate theories with full clarity and understanding; visuals significantly enhance comprehension and engagement.
Enthusiasm and technical (20 points)	Video lacks energy and engagement; speakers' voices are unclear or inaudible; minimal use of visual elements and on-screen annotations; video greatly exceeds or falls short of the time limit.	Limited engagement and clarity; voices are partially clear; some use of visual elements and annotations, though they do not fully engage viewers; video length slightly off target.	Good engagement and clarity; clear and audible voices; effective use of visual elements and annotations to support engagement; video closely matches the allotted time.	High energy and engagement; voices are clear and easy to understand; highly effective use of visuals and annotations; video precisely matches the time limit.
Understanding (20 points)	Presentation reflects minimal understanding of the subject matter, with significant gaps in knowledge.	Presentation shows some understanding but has notable gaps in knowledge.	Presentation demonstrates good understanding of the subject matter with only minor gaps in knowledge.	Presentation demonstrates a strong understanding of the subject matter with clear insights and no knowledge gaps.
Teamwork (10 points)	Unequal participation among team members; some members contribute minimally or not at all.	Unequal contributions, with most members participating at an acceptable level.	Mostly balanced contributions, with all members meeting minimum expectations for preparation and video involvement.	Fully balanced contributions, with all members equally involved in both preparation and video participation; each member adds to the presentation’s success.