Team Project: Futuristic Solutions to Grand Challenges

The goal of this team project is for you to develop a future solution to fulfill a need and/or opportunity related to one of the Grand Challenge areas, and to explore many aspects of its development and implementation. You will identify an opportunity to create added value for society (a need), develop a solution, and research current technologies and trends to show that your solution will be technically feasible in the future. As we will discuss in this course, there are also many social, cultural, global, legal, economic, and political factors that will affect the development and implementation of new and/or refined technologies. You will need to consider these 'societal' factors when developing your solution, and identify what challenges you may face in developing and implementing a solution that will, in the future, be technically feasible and economically viable while also creating value for society.

In this project, you will be required to investigate all aspects of the solution that you *imagine* may be developed and implemented in the future to help solve a Grand challenge-related problem. Specifically, in this project you will:

- **Identify an Opportunity** to create added value for society within one of the Grand Challenge Areas. Find an unfulfilled need or problem that you are interested in fulfilling and/or solving and develop requirements for a solution.
- **Develop a Solution** to that problem and/or need which you *imagine* may be developed and implemented in the future. Define the form, function, and key features of your solution which are necessary to fulfill the need and create value for potential customers' and/or society.
- Identify **key technologies and technological milestones** in the development and implementation of your solution. To start, you will need to identify specific current technologies (commercially available or in research stage) that will enable the development of your solution (enabling technologies). The current technologies should be materials, methods, processes, technologies, etc., that could be used 'as is' or after further future development to realize your solution. The goal is to identify the major components (materials, technologies, etc.) and technological advancements that are required for your solution to become a reality in order to prove that your solution will be technically feasible in the future.
- Identify **potential societal challenges** (moral, cultural, political, global, economic, legal, etc.) you could face in the future development and implementation of your solution.
- Describe the **societal benefits** of your solution (value created**)**, and other potential **impact** (positive and negative) that your solution could have on society (social, cultural, political, global, economic, legal, etc.)

Project Assessment

The project will be evaluated based on your team's presentation of the problem, solution, and important aspects of development and implementation described above. There will be 2 intermediate Project Deliverables due at specific times during the semester, as well as a poster and final presentation at the end of the project to summarize your work. **All team members must contribute to all project components.** You will be provided with additional document(s) containing details about the expectations for each major project assignment. A brief description of each of the assignments your team must complete and their due dates are listed below:

- **Project Needs Analysis (due 3/20 ASU, 3/21 UNSW):** Provide a detailed summary of the opportunity (unfulfilled need, problem, etc.) that your solution will address. Includes background information about the need/opportunity, description of relevant user groups, and

their specific needs. Identify which Grand Challenge area(s) the specific need/opportunity is related to and describe how it is related. *More detailed instructions provided in separate assignment document*

- **Project Solution and Technologies (due 4/3 ASU, 4/4 UNSW):** Provide a detailed description of what your solution is and how it works (including form and function). Describe all of the specific enabling technologies (currently available or in research stage) that that will be developed further, combined with other technologies, or used 'as is', to help make your future solution a reality. Identify and describe the key technology milestones that are necessary to develop and implement your future solution (i.e. improvements in technology capabilities, combining technologies, creating new technologies, etc.). *More detailed instructions will be provided in class and in a separate assignment document*
- **Poster (Share Draft for feedback 4/12 ASU, 4/13 UNSW; Final Poster due 4/21 ASU)** Provide a visual overview of the major aspects of your Future Solutions project (your solution, enabling technologies, technology development milestones, Social Challenges & Impact (Value Created)). These posters will be used to share your project solutions with others during a final Poster session at each university.
- **Presentation (slides submitted ASU 4/23 UNSW 4/24):** Provide a brief (12-15 minute) overview of the major aspects of your Future Solutions project (your solution, enabling technologies, technology development milestones, Social Challenges & Impact (Value Created)). All team members must participate in the presentation.

Project Evaluation

The total project grade will be determined based on all project components and deliverables described above. The points associated with each component are shown in the table below. **Individual grades will be based on the team's grade and the individual's contribution to the team (peer evaluation(s) will be used to assess team member contributions)**

Assignment	**Points possible**
Project Needs Analysis	70
Project Solution and Technologies	70
Poster	80
Presentation	80
Total	**300**