Preliminary Design Review: Evaluation Rubric (100pts)

User Needs (15%, ~2 minutes)	Excellent (typically "A" work)	Good (typically "B" work)	Fair (typically "C" work)	Needs Improvement (typically "D" and lower work)
Brief overview: - Disease state fundamentals - Existing solutions - Stakeholder analysis - Market analysis **Needs statement:** - Problem, Population, Outcome - Justified by information in brief overview Enumerated User Needs (given to you) - use or skip as your storyline needs	- Disease state fundamentals are summarized to support the Needs statement --- Disease state, patient journey, treatment, and healing and recovery describe the target population and superseding needs - Existing products / approaches are well described including what they are, how they work, their strengths/weaknesses --- The discussion of products as predicate devices (or not) and the required **regulatory pathway** are both correct - Therapeutic agent (growth factor, drug, etc) is introduced in disease or existing, before discussion in brainstorming and outputs - Stakeholders chart(s) presented are specific to your project, well-considered, and leave no major gaps --- Positives, negatives, and connections are clearly explained - Market analysis effectively communicates what gap this designed product will fill --- Major players discussed and justification for TAM/SAM/SOM division of the market is reasonable **All of the above culminates into the Needs Statement, such that:** **- Target Population is explained and justified** **- Problem is scoped down to a manageable problem** **- Desired Outcome is clear and grounded in reality** - Citations are ample and appropriate	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- Disease state is lacking in detail and/or does not convincingly elucidate the need - Clarity and/or a few missing details of the existing product(s), how they work, their strengths, and/or shortcomings - Therapeutic agent is not effectively introduced to properly orient audience to later content - Stakeholder Analysis oversimplifies (e.g. takes "too rosy of a view") or exaggerates the positive or negative reactions of stakeholders - Market Analysis does not effectively communicate market dynamics - Approach to TAM/SAM/SOM lacking in justification or quantification - Impact/magnitude is not quantified but is qualitatively described (or not described at all) - Improper scope or presence of embedded need - Problem narrative and/or framing is somewhat unconvincing, missing some supporting evidence from the four categories presented in class - Need statement is not concise and/or introduces new information not supported by the problem - Citations lacking or in inappropriate format		
Design Inputs (15%, ~2 minutes)				
Short-term Critical Design Requirements: - Matching **Specifications** and **Justifications** - Explain and justify **DRs related to Solidworks modeling and future COMSOL** work	- Design Requirements Table is present, text minimized, and portrayed in a way that is clear and easy to understand --- Explanation of how DRs relate to the User Needs is explict, concise, and clear - All DRs appear to be fully justified from a quick overview, and team members can go into detail if asked in the Q&A - The **DRs that are fully explained / presented on are appropriate for leading into other parts of the presentation** (Solidworks/Design Outputs, OR Future steps (V&V and COMSOL). ---Be able to explain other DRs if they come up in Q&A	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- Design Requirements are text heavy, small font, or otherwise difficult to read and follow-along during the presentation - Target specifications are incorrect or unrelated to the project - DR justifications are lacking or inaccurate - There is apparent confusion on how requirements, specifications, and justifications are different from one another --- ^including mislabeling between the three options - DRs that are focused on and explained in detail are not relevant to later parts of the presentation		
Brainstorming, Concept Evaluation (15%, ~1-2 minutes)				
- Brief overview of brainstorming - At least one **Pugh** for the **material choice**, justifying final choice **- Layout drawing** of complete design	- **Brainstormed ideas** are present (typically 1 slide) --- It is clear that teams went through the process of narrowing down from many ideas to a few. --- What aspects of design were being decided? --- Lists or sketches of all ideas brainstormed (even the wild ones!) - **Pugh(s)** are present and justified --- Explain **how to read** your Pugh, including what your **baseline** is, **score ranges** used, and weights (if used) --- Explain **what decision** pugh matrices were used for and what the results were - Results of Pugh are reflected in final choices, and lead into plan for design - **Sketches of "final" design** lead into next section (Solidworks) --- Hand drawn is fine, though lines should be crisp --- Include materials, therapeutic agent, coating method, and basic geometries - In back-up slides**/Optional: Pughs for the therapeutic,** coating methods, etc. justifying final choices	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- No discussion of brainstorming process, teams skip to top 3 or even skip straight to final device with seemingly no reasoning - Pughs missing, features unexplained, or not relevant to decisions needed for design - Justifications within Pugh are incorrect or use incorrect references - The "winning" choice in the Pugh was impacted by personal bias, and justifications for other choices are weak (thus creating/supporting bias) - Final choices are different from what the Pughs suggested, particularly if no further discussion was given - Transition from final choice to Solidworks creates whiplash, as choices shown in Solidworks do not match the narrative provided in this section		
Design Outputs (30%, ~2-3 minutes)				
Solidworks model of Design: - Technical drawings showing all key features Hip specific: - At least the implant / cup / liner (if using) - Bone, or plans for bone Bypass specific: - Unoccluded vessel / occluded vessel alone / occluded vessel with graft	- Technical drawings (".slddrw" file) are present with: --- All **dimensions and angles** labeled --- Multiple views of parts such that all dimensions are **visible and able to be labeled** --- U**nits** are indicated somewhere --- Screenshotted such that all of the above is clearly visible (i.e. you don't need the border) - Dimensions chosen **match what was presented** in the Design Requirements section of the presentation - **Materials** are stated and indicated on the parts with labels or verbally with gestures *- NOTE: Don't need full Solidworks assembly at time of presentation* *- NOTE: materials are not required to be finalized **in** the Solidworks model at this stage. Further, we fully anticipate that the dimensions will be updated after this presentation and after refined COMSOL simulations.*	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- Drawing files for some or all parts are missing, difficult to see/read, skimmed past, or otherwise made unviewable to the audience - Some or all dimensions are missing, obstructed from view, or otherwise unclear - The dimensions shown do not match what was presented in the DRs, without any explanation as to why - No units or incorrect units are used - It is unclear how the parts are related to the design project		
Future Steps (15%, ~2-3 minutes)				
Present planning for COMSOL and V&V: **- Design Requirements to verify with COMSOL** - **Physics to be modeled** --- Relevant Equations --- Constants, variables, and parameters of the equations are defined and described	- Briefly remind audience of the specs (goal posts) --- ^this might be addressed in an earlier section depending on narrative you build - **Design Inputs (requirements AND target specifications)** that will be verified in COMSOL are: --- **Accurately paired** with the COMSOL Physics model - **Physics** are **completely explained** and **accurately simplified** based on your design choices - Depiction of equations are **updated** from what was shown in lecture to **reflect your project and your proposed design's reality** --- Variables which **will be solved for by COMSOL** are correctly identified --- Constants or parameters that **are to be found in, or derived from, literature** are correctly identified and defined --- All variables, constants, or parameters are labeled as **known or unknown** to the team, **with notes about how team expects to research them**	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- Physical phenomena are not related to the design project, or it is unclear exactly how it relates - Physical phenomena are described incorrectly, either with an error in the equation or the description of the constants (or both) - There is a clear misunderstanding as to how COMSOL will be used to decide the variables within the equations - There is a clear misunderstanding as to how the variables relate to the specifications listed in the DRs. - The big picture of why we are using COMSOL is lost		
Presentation (10%)				
- Visual Presentation medium (typically ppt slides) - Oral Presentation (spoken part) - Q&A	- Presentation is submitted **on time (2pm on day of presentation),** appears to be **complete,** and includes **slide numbers** - **Contrast and Sharpness** allows text, figures, and equations to be read/seen - Content uses as much space as possible while not becoming overwhelming - Font choice is reasonable (consider sans fonts, ie. those without the little nubs as one sees in Times New Roman) - **Citations** are accurately matched to the information or images on the slides - Slides support the oral presentation and maintain a consistent format - Oral presentation follows a narrative that can be easily followed by the audience, and is **completed within the allotted time** - All team members present - accommodations can be arranged if necessary on a case-by-case basis. - Presenters can be heard, whether from projection or microphone use, and are making an effort to speak confidently - If notecards are employed, they are consulted *sparingly* - All team members are capable of answering questions	A **few minor** issues in categories such as the below:	**Several significant** issues in categories such as the below:	**Missing** key information and/or **substantial issues** in categories such as the below:
		- Presentation slides were submitted late (see syllabus for late policy), or the slides that were submitted are vastly different from the slides presented - Presentation used low contrast, leading to issues in reading / viewing the slides - Graphics were crowded on the slides, such that taking in the entire slide is impossible for the average viewer - Figures or equations were blurry, possibly copied and pasted from a lecture slide - Content is present but never addressed within the oral presentation, such that the average viewer may become overwhelmed or lost - Font choice is distracting to the average viewer - Clarity of the narrative is negatively affected by the quality and order of the slides; lack of slide numbers contributed to some confusion, slide formatting is inconsistent - Team presented for **longer than the allotted time, perhaps even being cutoff** by the teaching team - One or more team members does not speak, and the team did not communicate with the professors ahead of time. - Presenters can not be heard, and a microphone would have helped - Presenters spoke too fast and/or with a monotone, with little to no awareness of audience attention **- If only one person answers all questions, then points will be deducted**		