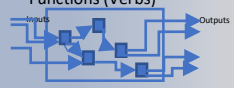
Mechanical Engineering and Mechanical Eng Tech vs EGEN 310

	Discover	Define	Ideate	Prototype	Test	Communicate
EGEN 310	• ***Background Research*** • ***Observation*** • ***Interaction with Stakeholders***	***Discoveries distilled into***: • Functions (Verbs)  • Objectives (Adverbs/Adjectives)  • Constraints = standards, non-functional design boundaries	***Generate ideas for design concepts***: • **Functions to Morph Charts**  ***Converging Design Space*** • **Objectives to Pugh Charts**	***Build a prototype to begin to fill in gaps in design knowledge*** • Prototype … • To test most uncertain parts • If fundamental physical modeling is not possible • If statistical information is required • To learn about fit and tolerance of components • Long List of System Interfaces • FMEA • System Integration	***Set up experiments and test to learn more about uncertain design aspects*** • Clearly identify variables in question • Define what constitutes an "effective" result • Summarize next steps	***Utilize MANY forms of communication to inform your team, client and stakeholders about your design process*** • *Face to Face Meetings*: Team meetings (with/without instructor), with other instructors, with Makerspace and Innovation Alley staff • *Written Communication*: Texts, emails, memos, A3, Readme Files, Smartsheet • *Visual Communication*: Fabrication drawings, terrain maps, sketches and schematics, photos, videos, charts to document design process, spreadsheets for numerical models
Mechanical Engineering & Mechanical Eng Tech	• ***Customer interaction and approval*** • ***Needs evaluation*** • ***Background research***	• ***Level 1 requirements are defined by the sponsor*** • High level, "baseline" requirements • Generally not specific and often stated in "layman's terms." • ***Design specifications are defined by the team*** • These are actual numbers that provide constraints and goals for the design team • They utilize engineering terminology for design targets	• ***Alternatives Generation*** • Free-wheeling brainstorming sessions • Imagination, creativity, freedom from excessive outside influences required! • Background knowledge is necessary to find alternatives that might otherwise go unidentified • ***Alternatives Evaluation and Selection*** • Rank alternatives against important criterion ("Pugh chart" or "evaluation matrix")	• ***Detailed Design*** • Detailed Layout Creation • Engineering Analysis • Low-Res Prototyping • Detailed Drawings • Assembly Drawings • ***Manufacturing Planning*** • Material/Parts Order • Finalize Operations Sheets • Fabrication Space/Access • Tooling • Detailed Part Setup • CNC Setup • QA Plan • ***Fabrication and Assembly*** • Detailed Part Fabrication • CNC Code Generation • Manufacturing Operations • QA • Test Planning	• ***Product Evaluation Testing*** • Acceptance Testing • Performance Testing • Repair & Re-assembly	***Utilize MANY forms of communication to inform your team, client and stakeholders about your design process*** • *Face to Face Meetings*: Team meetings (with/without instructor), with other instructors, with client, with Makerspace and Innovation Alley staff • *Written Communication*: Texts, emails, memos, A3, Smartsheet, formal reports • *Visual Communication*: Part drawings, assembly drawings, fabrication drawings, sketches and schematics, photos, videos, charts to document design process, spreadsheets and other visual output for numerical models, poster for design fair • *Oral Presentation*: formal oral presentations to instructor/sponsor