Engineering Design & Development

Michigan 9-12 Grade Math Strand/Standard Linked	Unit 1 Introduction Engineering						
	Students will be able to describe and define the purpose and rationale of the course and the skills and knowledge bas	Students will be able to describe the characteristics of a successfully completed project based on previously complete	Students will be able to distinguish the differences between the goals of this class and the type of projects done in oth	Students will be able to describe and define the structure for evaluating a research project.	Students will be able to list examples of levels of performance within the grading structure of this course.	The students will be able to create a resume to record their academic achievements and extra-curricular activities in s	The students will begin to develop a portfolio of their past accomplishments and research project.
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STANDARD L3: MEASUREMENT AND PRECISION							
STANDARD L4: MATHEMATICAL REASONING, LOGIC, AND PROOF							
STRAND 2: ALGEBRA AND FUNCTIONS							
STANDARD A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES							
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STRAND 4: STATISTICS AND PROBABILITY							
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Michigan 9-12 Grade Math Strand/Standard Linked	Unit 2 Elements of Formation															
	Students will be able to recognize a need for retaining in one location all information relevant to the research project.	Students will be able to identify information encountered in the research process that belongs in the journal.	Students will design a format for the journal, which is well-organized and easy to use.	Students will use their journal as the source for returning to any desired previously encountered information.	Students will be able to use conventional library resources as a starting point for all research.	Students shall be able to choose the appropriate media to obtain the desired information.	Students will be able to distinguish relevant from irrelevant web sites.	Students will be able to manipulate search engines to find specific information.	Students will create strategies for identifying key terms that narrow their search topic.	Students will examine on-line databases to search for patents, people, business, Government and Academic informat	Students will correspond by E-mail including the use of attachments.	Students will differentiate between an E-mail address and a Web site address.	Students will be able to compose a business letter and a thank you letter.	Students will define the positive characteristics for personal interviewing. (e.g. courtesy, professionalism, listening skil	Students will develop communication skills that will allow them to converse over the phone and conduct a face to face	
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Michigan 9-12 Grade Math Strand/Standard Linked	Unit 3 Guided Research																	
	The learner will be able to use a decision matrix in narrowing a topic of research.	The students will be able to develop and define constraints and specifications for use in a decision matrix.	The student will be able to use a decision matrix to rank order alternatives.	The student will be able to use decision matrices to develop a concise problem statement.	The students will be able to discuss and explain key issues and terminology within their topic area.	The students will be able to narrow the topic focus using the decision matrix.	The students will be able to give an oral presentation.	Based on their research students will be able to develop a problem statement.	The students will be able to apply the decision matrix to a problem, justifying their problem statements based on previ	Students will be able to generate a list of existing solutions to their research problem.	Using decision matrices, students will be able to evaluate the advantages and disadvantages of present solutions to t	Following a review of the specifications and constraints identified in their decision matrices, students will be able to de	The students will be able to conduct preliminary patent searches to determine the originality of their alternative choice	The students will be able to conduct research to determine the merit of their alternative choices based on the state of	Students will be able to identify techniques for delivering formal presentations.	Students will be able to choose an appropriate formal presentation format and prepare their presentation.	Students will be able to construct and deliver a PowerPoint presentation centered on their topic of research.	
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Michigan 9-12 Grade Math Strand/Standard Linked	Unit 4 Independent Research													
	The students will be able to define and demonstrate time management planning skills as they pertain to their project.	The student will be able to identify methods and sources for obtaining materials and supplies.	The student will complete an independent research project.	The students will provide a detailed set of instructions for producing a testable prototype based upon their research a	The students will be able to identify safe practices for the use of tools and equipment.	The students will be able to create and justify a process for testing their prototype design that will yield valid data cond	The students will review their testing procedures to determine the validity of the testing procedures.	The students will be able to apply the appropriate statistical analysis tools to their test results to ensure their validity a	The students will be able to identify, define, and implement needed modifications to their design based upon their ong	The students will be able to evaluate and explain the effectiveness of their design at solving the problem that they hav	Students will arrange the data and information compiled throughout the project and compose a technical research pa	Students will use a standardized format for composing their research papers.		
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Michigan 9-12 Grade Math Strand/Standard Linked	Unit 5 Formal Presentation			
	The student will be able to discuss their findings in a formal presentation before an audience.			
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