Engineering Design and Development	Unit 1 Introduction Engineering							Unit 2 Elements of Formation															Unit 3 Guided Research																	Unit 4 Independent Research												Unit 5 Formal Presentation			
	Students will be able to describe and define the purpose and rationale of the course and the skills and knowledge b	Students will be able to describe the characteristics of a successfully completed project based on previously comple	Students will be able to distinguish the differences between the goals of this class and the type of projects done in c	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 i	The students will begin to develop a portfolio of their past accomplishments and research project.	Students will be able to recognize a need for retaining in one location all information relevant to the research projec	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 inform	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 s	Students will develop communication skills that will allow them to converse over the phone and conduct a face to fa	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 pr	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 t	Following a review of the specifications and constraints identified in their decision matrices, students will be able to	The students will be able to conduct preliminary patent searches to determine the originality of their alternative choi	The students will be able to conduct research to determine the merit of their alternative choices based on the state	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.	The students will be able to define and demonstrate time management planning skills as they pertain to their projec	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	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 cc	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	The students will be able to identify, define, and implement needed modifications to their design based upon their o	The students will be able to evaluate and explain the effectiveness of their design at solving the problem that they h	The students will arrange the data and information compiled throughout the project and compose a technical research p	Students will use a standardized format for composing their research papers.	The student will be able to discuss their findings in a formal presentation before an audience.			
Michigan 9-12 Grade Math Strands/Standards/Indicators																																																							
MATH GRADES 9-12: http://www.michigan.gov/mde/0,1607,7-140-38924_41644_42668---,00.html																								x	x	x				x																		x			x					
STRAND 1: QUANTITATIVE LITERACY AND LOGIC																										x				x																		x			x					
STANDARD L1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE SITUATIONS																																																			x					
QSRR1.2 Representations and Relationships																																																			x					
QSRR1.2.4 Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media.																																																			x					
STANDARD L3: MEASUREMENT AND PRECISION																																																x								
QSMP3.2 Understanding Error																																																x								
QSMP3.2.3 Know the meaning of and interpret statistical significance, margin of error, and confidence level.																																																x								
STANDARD L4: MATHEMATICAL REASONING, LOGIC, AND PROOF																										x				x																		x			x					
QSMRLP4.1 Mathematical Reasoning																										x				x																		x			x					
QSMRLP4.1.2 Differentiate between statistical arguments (statements verified empirically using examples or data) and logical arguments based on the rules of logic.																										x				x																		x			x					
QSMRLP4.2 Language and Laws of Logic																										x				x																										
QSMRLP4.2.2 Use the connectives NOT, AND, OR, and IF, THEN, in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.																										x				x																										
QSMRLP4.2.3 Use the quantifiers THERE EXISTS and ALL in mathematical and everyday settings and know how to logically negate statements involving them.																										x				x																										
QSMRLP4.2.4 Write the converse, inverse, and contrapositive of an If, then statement; use the fact, in mathematical and everyday settings, that the contrapositive is logically equivalent to the original while the inverse and converse are not.																										x				x																										
QSMRLP4.3 Proof																										x				x																										
QSMRLP4.3.1 Know the basic structure for the proof of an If, then statement (assuming the hypothesis and ending with the conclusion) and know that proving the contrapositive is equivalent.																										x				x																										
QSMRLP4.3.2 Construct proofs by contradiction; use counterexamples, when appropriate, to disprove a statement.																										x				x																										
QSMRLP4.3.3 Explain the difference between a necessary and a sufficient condition within the statement of a theorem; determine the correct conclusions based on interpreting a theorem in which necessary or sufficient conditions in the theorem or hypothesis are satisfied.																										x				x																										
STRAND 4: STATISTICS AND PROBABILITY																								x	x																															
STANDARD S4: PROBABILITY MODELS AND PROBABILITY CALCULATION																								x	x																															
SPPMPC4.2 Application and Representation																								x	x																															
SPPMPC4.2.2 Apply probability concepts to practical situations, in such settings as finance, health, ecology, or epidemiology, to make informed decisions																								x	x																															