WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

ECE 451: Capstone Design I
Master Syllabus

Catalog Data:	**ECE 451: Capstone Design I**; 2 credits First of a two-course senior design project sequence; design for manufacture, schedule estimation and tracking, costing, ethics and proposal writing. Typically offered in Fall.
Class Schedule:	Three lecture hours per week, for one semester.
Laboratory Schedule:	None
Prerequisites by Course:	ECE 325; ECE 370; ENGL 402; senior standing; certified major in Electrical Engineering
Prerequisites by Topic:	1. Electrical/electronic system design including hardware and software components 2. Knowledge of all major areas of electrical engineering (digital, analog electronics, computers, signals and systems, communications, microelectronics, power systems) 3. Design processes and practice 4. Technical writing
Typical Text(s):	None
Typical Reference(s):	None
Course Coordinator:	Dr. Feng Zhao
Course Objectives:	1. Systems design objectives: assign students a project that will allow them to integrate a majority of their skills acquired in the last four years regarding engineering science, design, and communication. 2. Identify and define a design project through class presentations by practicing electrical engineers from a sponsor company. 3. Conduct research and apply the knowledge gained in other courses to solve electrical engineering problems, and submit individual progress reports and/or weekly research paper assignments. 4. Draft, revise, and resubmit progress reports and/or research papers as work is being evaluated. Students will be encouraged to work with the WSU Vancouver Writing Center staff throughout the semester. 5. Work in groups on a sponsored project, and design electrical and/or computer systems with assistance by both faculty and/or an industrial mentor assigned by the sponsor company. 6. Acquire a "customer" ethic by providing deliverables and an appropriate level of engineering service to their sponsor. 7. Learn and demonstrate both oral and written engineering communication skills. 8. Consider cost and time constraints (economic considerations) in execution of a design project. 9. Consider safety, ethical, and other societal constraints in execution of design projects.
Topics Covered:	1. Design process and project planning. 2. Requirements gathering.

		3. Engineering ethics, patent law, and negotiation skills. 4. Engineering organizational structures. 5. Career paths. 6. Technical report writing. 7. Technical oral presentation. 8. Group dynamics and teamwork skills. 9. Integration of skills and concepts developed in previous courses to find a design solution for an industrial project.
Lab Experiments and Activities:		None
Course Outcomes:	Students will be able to:	
	Assessed for Student Outcomes	2-a. Define engineering problems from sponsor needs for electrical and/or electronic devices and systems. 2-b. Apply design process to satisfy capstone project requirements for electrical and/or electronic devices and systems. 2-c. Analyze an engineering system within sponsors proposed constraints such as public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors in the design process. 4-b. Make ethical judgements in situations involving capstone projects safety, intellectual property, reporting data, etc. 7-a. Use resources effectively to learn new material not taught in class in capstone projects.
	Other	3-a. Produce capstone project reports for various audiences using appropriate formats and grammar with discipline-specific conventions including citations. 3-b. Deliver well-organized, logical oral capstone project presentations accommodating audience interests and background, including good explanations when questioned. 4-a. Evaluate engineering solutions considering the global, economic, environmental and societal impacts for the project. 5-a. Establish goals, tasks, timeline, etc. as a team for the capstone project. 5-b. Share responsibilities and information on capstone project schedule and tasks with other members of the team. 5-c. Collaborate with individuals with diverse backgrounds, skills and perspectives in capstone project.
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 3, 4 Student Outcomes 2, 3, 4, 5, 7
Prepared by:		Date: Mar. 20, 2018; 3/27/18 mb; 8/31/21