WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

MECH 414: Machine Design II

Catalog Data:		**414 Machine Design II** 3 Course Prerequisite: MECH 215; MECH 309; MECH 314; Certified major in Mechanical Engineering. Static and fatigue failure theories applied to design of mechanical elements, stress analysis and finite elements; design for fatigue life of various mechanical elements, design and selection of standard mechanical components, and design of clutches and brakes. Typically offered Fall.
Class Schedule:		Three 50-minute lecture sessions per week, for one semester.
Laboratory Schedule:		None
Prerequisites by Course:		Certified MECH Major, MECH 215, MECH 309, MECH 314
Prerequisites by Topic:		Strength of Materials, Dynamics/Dynamics of Machinery
Textbook:		Shigley, J.E., Budynas, R.G., and Nisbett, J.K., *Mechanical Engineering Design*, 10th Edition, 2015, McGraw-Hill Publishing Company.
Course Coordinator:		Dr. Hamid Rad
Course Objectives:		1. Analyze and select machine elements/components. 2. Design of machine elements such as shafts, fasteners, springs, bearings, and power transmitting elements like gears, belts and chains. Design of clutches and brakes. 3. Solve open-ended design problems by integrating various machine elements and components
Topics Covered:		1. Design of mechanical components such as shafts to transmit power, springs, fasteners, etc. 2. Selection/design of mechanical elements such as belts, chains, and bearings. 3. Fundamentals of gears, spur, helical, bevel, and worm gear set; their applications, advantages and disadvantages of one over the other. 4. Design of different types of gears, spur, helical, bevel and worm set for the purpose of power transmission. 5. Design of clutches and brakes.
Lab Experiments and Activities:		None
Course Outcomes:	Students will be able to:	
	Assessed for Student Outcomes	1-a. Demonstrate knowledge of fundamental scientific and/or engineering principles such as failure theories to design mechanical components subjected to static and repeated loadings. 1-c. Use appropriate models to formulate solutions to design various mechanical parts/components such as shafts, springs, welds, gears, etc. 1-d. Apply mathematics, scientific and/or engineering principles toward solving machine design problems with a wide range of mechanical components. 2-b. Apply the engineering design process (such as concept generation, modeling, evaluation and iteration) to satisfy project requirements for mechanical systems. 2-c. Analyze an engineering system within realistic constraints, such as economic, environmental, social, cultural, global, public health, safety, welfare, and other factors appropriate to machine design.

	Other	1-b. Evaluate information to identify engineering problems. 2-d. Produce solutions that meet specified needs for engineering designs. 5-a. Establish common goals, tasks, timeline, etc., as a team. 5-b. Share responsibilities and information on project schedule and tasks with other members as a team. 5-c. Collaborate with individuals with diverse backgrounds, skills and/or perspectives to meet objectives.		
Required or Elective Course:		Required		
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 3 Student Outcomes 1, 2, 5		
Prepared by:		Dr. Hamid Rad	Date:	March 15, 2018 (4/10/18 mb)
Approved by USC:		4/16/18		