

SYLLABUS
PART I
EDISON STATE COMMUNITY COLLEGE
EGR 264S ELECTRIC VEHICLE DRIVE SYSTEMS
3 CREDIT HOURS

COURSE DESCRIPTION

Introduction to drive systems of electric vehicles (EV) with an emphasis placed on electric motors and invertors. Topics covered include permanent magnet synchronous motors, brushless DC motors, induction motors, and 3 phase AC induction motors. The course will also discuss the most popular technologies in use by companies today. There will be lectures and hands-on labs to illustrate a practical and theoretical understanding of the technologies. Prerequisite: EGR 160S. Lab fee.

COURSE GOALS

The student will:

Bloom's Level		Program Outcomes
1	1. Understand safety requirements of working with batteries and drive systems.	4
2	2. Classify different EV drive technologies and their applications.	2
1	3. Describe drive systems in use today.	1, 2
2	4. Understand applications of synergy drives and design evolution.	2, 3
2	5. Explore hands-on examples of drive systems in EV and hybrids.	3, 4
2	6. Explore ways to troubleshoot and potentially rebuild drive systems.	4
2	7. Explore different approaches to drive designs in different manufacturers.	1, 2, 3
2	8. Distinguish between different hybrid and EV drive systems.	2, 3
3	9. Identify potential drive technologies of the future.	1, 3
1	10. Identify skills needed for future EV drive sector jobs.	1, 2, 3, 4
3	11. Apply engineering mechanics and electrical principles to solve problems.	4

CORE VALUES

The Core Values are a set of principles that guide in creating educational programs and environments at Edison State. They include communication, ethics, critical thinking, human diversity, inquiry/respect for learning, and interpersonal skills/teamwork. The goals, objectives, and activities in this course will introduce/reinforce these Core Values whenever appropriate.

TOPIC OUTLINE

1. Introduction to identifying a motor and how to safely work with motor systems
2. Drive types, including history, political issues, and costs
3. Principles of energy in drives AC and DC
4. Drive systems, including permanent magnet motors and synchronous motors
5. Drive systems, including brushless DC motors and their application
6. Drive systems, including AC induction motors and their application
7. Efficiency of systems in direct and geared applications

8. Purpose and operation of regenerative braking systems
9. Hybrid systems compared to pure EV systems
10. Lab exercises to rebuild and troubleshoot systems
11. Skills needed in the motor and drive manufacturing sector and its growth