Approval: 13th Senate Meeting

Course Number	**:** EE 604P
Course Name	**:** Practicum on Advanced Electric Drives
Credits	**:** 0-0-3-2
Prerequisites	**:** EE508 - Fundamentals of Electric Drives, EE508P - Practicum on Electric Drives or Equivalent
Intended for	**:** M.Tech in Power Electronics and Drives (PED)
Distribution	**:** Core for M.Tech in Power Electronics and Drives (PED)
Semester	**:** Even (Feb-May)

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1. **Preamble:** Practicum on Advanced Electric Drives is a laboratory course which is designed to accompany the course on Advanced Electric Drives, both of which are core (mandatory) courses for M.Tech (PED) students in their second semester. These courses together are designed to make the students well aware of the state-of-the-art high-performance electric drives. The laboratory sessions are designed to enable the students to perform hands-on experiments with advanced drives. The course will also involve a design mini-project and study of a recent research paper.

2. **Course Modules with Quantitative lecture hours:** This is a laboratory course with 3-hour sessions per week. Following is the tentative structure of the course.

Part 1: Predesigned experiments on the following topics

1. Induction Motor Drives **(9 hours)**
   Field oriented control of induction motor, Direct torque/flux control of induction motor, Effect of parameter variation on the above control performance, Power Failure Ride-through of induction motor drive, Sensorless control of induction motor drive – methods of speed estimation
2. Synchronous Motor Drives **(9 hours)**
   Vector control of synchronous motor drive, Controller design
3. Other Motor Drives **(6 hours)**
   Vector control of PMSM, Closed loop control of BLDC drive, Closed loop control of SRM drive

Part 2: Design Project: Sizing and controller design for a closed loop drive for a given application - This will be in form of a course project **(9 hours)**

3. Textbook

4. References:

W. Leonhard, Control of Electrical Drives, Springer-Verlag Berlin Heidelberg, 2001.

Mohan N., Undeland T. M. and Robbins W. P., Power Electronics - Converters, Applications and Design, 3rd Edition, Wiley India, 2008.

Bose B. K., Power Electronics and Variable Frequency Drives - Technology and Applications, IEEE Press, Standard Publisher Distributors, 2001.

Rashid M., Power Electronics - Circuits, Devices and Applications, 3rd Edition, Pearson Education.

Krause, P. C., Wasynczuk, O., Sudhoff, S. D., Analysis of Electric Machinery and Drive Systems, New York, Wiley-Interscience.

5. **Similarity Content Declaration with Existing Courses:** Less than 10% with EE508
6. **Justification for new course proposal if cumulative similarity content is > 30%:** N/A