

# ECGR4143/5195 Electric Machines and Drives

## Catalog Course Description

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Theory of transformers and rotating machines; harmonic and saturation effects on machine performance. Unbalanced operation and transient conditions.

## Class Topics

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1. Understand electrical circuit modeling
2. Determining torque and force in machines using energy and co-energy.
3. Understanding of saturation
4. Understanding of reluctance machines
5. Understanding of space harmonics in rotating machines
6. Understanding of synchronous, induction and DC machines
7. Variable frequency operation of induction and synchronous machines
8. Introductory understanding of machine dynamics
9. Understanding of the use of machines in a power system
10. Inverter operation and modeling
11. Adjustable speed and torque drives

## Course Objective

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The objective of this course is for senior-level students to learn advanced topics in electrical machinery and electromechanical energy conversion.

## Course Lecturer

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Jonathan Bird

Tel: 704-687-8595 Email: j.bird@uncc.edu

Office Hours: Wednesday 2-4pm (or just stop by)

Lecture Room: EPIC 2230

Lecture Time: Tuesday and Thursday, 3:30-4:45pm

Office: EPIC 2166

## Teaching Assistant's Office Hours

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No teaching assistant

## Course Prerequisite

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ECGR 3142 Electromagnetic Devices with a grade of C or better

## Course Textbook

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Fitzgerald A. E., Kingsley C., Umans S. D., *Electric Machinery*, 5<sup>th</sup> Edition or 6<sup>th</sup> Edition, McGraw-Hill.

## Suggested Reference Textbooks

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Chapman S. J., *Electric Machinery Fundamentals*, 3<sup>rd</sup> Edition or later, McGraw-Hill

Guru B. S., Hiziroğlu H. R. *Electric Machinery and Transformers*, 3<sup>rd</sup> Edition, Oxford University Press, 2000

Sarma M. S. *Electric Machines: Steady-State Theory and Dynamic Performance*, 2<sup>nd</sup> Edition, CL Engineering, 1994

## Grading

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The final grade will be determined as follows:

Homework's	30%
Experimental Project(s)	20%
Test	20%
Final Exam	30%