Computer Science CSC 291  
Computer Science Research Methods

CREDITS AND CONTACT HOURS: Credit Hours: 2 Contact Hours: 28

INSTRUCTOR:  
Dr. Andrew Watkins

TEXTBOOKS: No required material  
a. Supplemental Material: Relevant documents, articles, and document templates are provided by the instructor

SPECIFIC COURSE INFORMATION:  
a. Catalog Description: Performing undergraduate research in computer science requires that students have foundational knowledge and skills related to research methodology. In this course, students will learn the basics of performing research including how to identify a research problem, performing background research, reading published research, and developing a research plan.  
b. Prerequisites: CSC 245 and MTH 161  
c. Required/Elective: Computer Science – Required

SPECIFIC GOALS OF THE COURSE:  
a. Specific Outcomes of Instruction:  
1. To develop an understanding of and appreciation for the skills required to perform scientific research, particularly research in computer science  
2. To improve communication skills—written, oral, and visual  
3. To develop critical and analytical thinking skills by reading and understanding scientific literature  
4. To demonstrate the ability to synthesize existing research into a coherent survey of some aspect of computer science  
5. To demonstrate the ability to replicate scientific findings  
6. To demonstrate the ability to develop a basic research plan  
b. CAC Criterion 3 Outcomes Addressed by this course:  
f. An ability to communicate effectively with a range of audiences  
g. An ability to analyze the local and global impact of computing on individuals, organizations, and society  
h. Recognition of the need for and an ability to engage in continuing professional development  
j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
TOPICS COVERED:
1. What is research
2. Overview of broad sub disciplines in computing
3. Student-led discussions of work from research literature
4. Literature summaries
5. Library orientation
6. Developing a survey paper
7. Replication of scientific results
8. Overview of departmental research efforts
9. Presentation of survey paper
10. Hypothesis testing
11. Research questions
12. Presentation of replication studies