DO NOT TYPE IN THIS BOX

Bulletin # : 2

Academic Year : 2022-23

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a New Course

1. **School/College** College of Engineering and Computing

   Div./Dept. in Which Taught Knight Foundation School of Computing and Information Sciences

2. | CIS | 6 | XXX | | 3 |
   |---|---|---|---|---|
   | Alpha Prefix | 1st Digit | Last 3 Digits | "C"-lec-lab "L"-Lab | Cr. Hrs. |

   CIP Code *(Leave this blank):* _____

CIS 6329

3. **Grading Method (select one):** ☐ Graded ■ Pass/Fail

4a. **Course Title** Research Methods in Computer Science

b. **Abbreviated course Title** *(for computer class schedules, transcripts)* RSRCH METHODS COMP. SC.

LIMITED TO 25 Characters *(including spaces)*

5. **Statewide Course Numbering Subject Matter Area** _____

6. **Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*

   College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

   Techniques and conventions in the design, conduct and support of scientific and applied research in computer science. Research methods, evaluation approaches, and dissemination of results.

7. **Attach detailed syllabus course outline and course justification on separate page(s).**
8. **Prerequisite(s):** Ph.D. standing in computer science or permission of the instructor
9. **Corequisite(s):** _____
10. **Objective(s) of Course:**

    The course aims to provide deep understanding of research methods in various subfields of computer science.

11. **Does this course duplicate/overlap other courses at FIU?** ■ No ☐ Yes
    If yes, please explain: _____
12. **What other closely related department(s) have been consulted about this course?**

    _____
13. **Is this course used for the assessment of a program or a certificate (if yes, then send a notification to assessment@fiu.edu)?** ☑ No ☐ Yes

PROPOSAL REQUESTED BY:

Faculty Contact Dr. Niki Pissinou _____ 1 / 12 / 20 22
(Type name) (Signature)

pissinou@fiu.edu _____
(Email address) (Phone number)

Chairperson (Dept./Div.) Dr. Jason Liu _____ ____ / ____ / 20____
(Type name) (Signature)

Chairperson (Curr. Comm.) Dr. Alexander Afanasyev _____ ____ / ____ / 20____
(Type name) (Signature)

College/School Dean Dr. John Volakis _____ ____ / ____ / 20____
(Type name) (Signature)

Submit one original form. Attach one copy of the course justification and a draft of the course syllabus for this New Course Proposal. The syllabus should include the course description, objectives, learning outcomes, major topics, and textbooks.

FIU | Engineering & Computing

FLORIDA INTERNATIONAL UNIVERSITY

To: Mary Cossio
Faculty Senate

From: Faculty Contact and KFSCIS Interim Director

Subject: Memo in Lieu of Curriculum Chair and Dean Signatures for Bulletin #1

Date: September 16, 2022

As instructed by the Faculty Senate, this memo will serve as approval of the attached proposals from KFSCIS for Bulletin #1 by faculty contact (Niki Pissinou) and KFSCIS Interim Director (Jason Liu), in lieu of physical signatures. The proposals in this Bulletin were approved by our Curriculum Committee on September 13, 2022.

Knight Foundation School of Computing and Information Science

CIS 6xxx Research Methods in Computer Science

Most undergraduate and graduate curricula consist of coursework-not research. As such, the majority of our students come to our doctoral program with little or no research experience. To perform their research well and to cut-down wasted time and money, this course provides students with the necessary knowledge to undertake better research and conceivably become successful career researchers. It offers students the opportunity to learn the various aspects of the research process and methodologies for computer science including framing useful research questions, research design, data collection, analysis, writing and presentation.

School of Computing and Information Science

Course Title: Research Methods in Computer Science **Date:** 09/01/2021

Course Number: CIS 6xxx,

Number of Credits: 3

Subject Area: Computer Science	**Subject Area Coordinator:** **email:**
Catalog Description: Techniques and conventions in the design, conduct, and support of scientific research in computer science. Research methods, evaluation of approaches, and presentation and dissemination of results. Domain specific research methods in such application areas.	
Textbook: None. Reading materials throughout the semester.	
References: 1. Durrheim, Kevin. "Research design." *Research in practice: Applied methods for the social sciences* 2 (2006): 33-59. 2. Engwa, G. A., and N. M. Ozofor. *Fundamentals of Research Methodology*. Nova Science Publishers, Inc, 2015. 3. Faye, Youssou, Assane Gueye, Bamba Gueye, Dame Diongue, and Mandicou Ba. "Research in Computer Science and Its Applications." 4. Mason, Robert L., Richard F. Gunst, and James L. Hess. *Statistical design and analysis of experiments: with applications to engineering and science*. Vol. 474. John Wiley & Sons, 2003. 5. Patten, Mildred L., and Michelle Newhart. *Understanding research methods: An overview of the essentials*. Routledge, 2017. 6. Wang, Jiacun, and William Tepfenhart. *Formal Methods in Computer Science*. Chapman and Hall/CRC, 2019.	
Prerequisite Courses: Ph.D. Standing in Computer or permission of the instructor.	
Corequisite Courses: None	

Type: Elective for students pursuing a Ph.D. in Computer Science.

Prerequisite Topics:

- None
-

Course Outcomes:

Students who successfully complete this course will be able to:

1. Analyze the strengths and weaknesses of research methodologies in CS.
2. Choose suitable method(s) for the investigations.
3. Formulate a research Problem
4. Evaluate different research works.
5. Apply an appropriate research methodology for a given research problem.

6. Explain the ethical responsibilities of scholarship.
7. Develop a research proposal.

Grading Standards:

The following provides the grades and numeric values that comprise the standard grading system: Grade Points Per Credit Hour A 4.00 A- 3.67 B+ 3.33 B 3.00 B- 2.67 C+ 2.33 C 2.00 D 1.00 F 0.00. Students who satisfactorily complete the course (at the "B" or better level), will receive a "Pass (P)."

Tentative Outline:

Topic	***Hours (Total: 37.5 hours = 15 weeks * 2 lectures/week * 1.25 hrs/lecture)***	**Week**	**Outcome**
1. Introduction: Course Overview, Logical Foundations of Empiricism, Scientific Method	**3**	1	***1,2***
2. Proposing and Performing Research (Types of papers (survey, position, research etc), Problem Identification, Literature Review and Citation, research question and Hypotheses, Identifying Subjects, Selecting Appropriate Methodology, Writing a proposal, Assessment and evaluation)	**9**	2,3,4	***1,2,3***
3. Research Techniques (Controlled experiments, Users studies, surveys and survey, Empirical studies, Formal Proofs, Mathematical Modeling, Performance Metrics, Simulation, Data Gathering, Validation and Analysis, Proper Use of Statistics, Closed Form vs Approximate Solutions	**9**	5,6,7	***1,3,4,5,7***
4. Experiment Design	**3**	8	***1,2,3,5,7***
5. Writing Short and Long Papers	**1**	9	***3,7***
6. Reading Papers	**1**	9	***1,2,3,4,5,6,7***
7. Peer review and publications	**1**	9	***4, 6***
8. Data Processing	**2**	10	***1,2,3,4,5,7***
9. Statistics	**2**	10-11	***1,2,3,4,5,7***
10. Graphs and visualization	**1**	11-12	***1,2,3,4,5,7***
11. Oral Presentations and tools	**1**	12	***1,2,3,4,5,6***
12. Application Domains (simulation modeling, algorithm analysis, telecom and networking, cybersecurity)	**2,5**	12	***1,2,3,4,5,6,7***
13. Project Management	**1**	13	***1,2,3,4,5,6,7***

14. Conduct of Research (Ethics, Plagiarism, Intellectual Property and legal issues)	**1**	13	***6***
15. Presentations	**6**	13-15	

Performance Measures and Assessment

Because there are several course objectives, students' performance will be assessed on several measures as follows;

Assessment Task	**Weighting**	**Individual/Group**	**Learning Outcomes**
Written critique of a research paper	5%	Individual	***4, 6***
Written short survey of related work	15%	Individual	***1,2,3***
Construct and refine an appropriate methodology for a research question. Short paper	10%	Individual	***1,3,4,5,7***
Research term project: Demonstrate the ability to produce designs for a range of specific methodologies and carry out the investigation. Written submission and presentation	20%	Individual	***1,2,3,4,5,6,7***
Produce a short research paper. Written paper	40%	Individual	***3,7***
Presentation of a research paper in class	10%	Group	***1,2,3,4,5,6***
Total	100%		

Policies

This course will require students to carry out pre-reading. The class will consist of mini-lectures, group discussions, collaborative activities, presentations, and peer evaluations. It is essential that students are prepared before attending. Students are expected to abide by all FIU policies (https://dasa.fiu.edu/all-departments/student-handbook/). As a member of the FIU community, a student is expected to be knowledgeable about the behavioral expectations set forth in the FIU Student Conduct and Honor Code Links to an external site. This course will serve to embrace the diversity and inclusivity found within Florida International University.

How the final grade will be calculated

Final grade is calculated by adding all the assignments according to their weight in the course grading scheme (both graded and ungraded assignments) This course will be graded around a target mean of 3.33 and a permitted variance of +0.17 or -0.17.

Attendance: Regular and timely attendance is expected of all students.