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Bulletin # : 3

Academic Year : 2019-20

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a New Course

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

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

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

   CIP Code *(Leave this blank):* _____

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

4a. **Course Title** Introduction to Cryptocurrencies

b. **Abbreviated course Title** *(for computer class schedules, transcripts)* Intro to Cryptocurrencies

LIMITED TO 25 Characters *(including spaces)*

5. **Statewide Course Numbering Subject Matter Area** IDC (Interdisciplinary Computing)

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.

High-level conceptual survey of crypto-currencies and other blockchain technologies for non-CS undergraduates, including techniques, applications, ethics and philosophical issues.

7. **Attach detailed syllabus course outline and course justification on separate page(s).**
8. **Prerequisite(s):** MAC-XXXX or MAD-XXXX or MGF-XXXX (any math course at any level)
9. **Corequisite(s):** None
10. **Objective(s) of Course:**

Be familiar with crypto-currency technologies, a selection of fundamental concepts in blockchains.
Understand the philosophical & ethical issues
Recognize security & privacy issues.

11. **Does this course duplicate/overlap other courses at FIU?** ☒ No ☐ Yes
    If yes, please explain: n/a
12. **What other closely related department(s) have been consulted about this course?**
    n/a
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 Kianoosh Boroojeni (Type name) _____ (Signature) 11 / 25 / 2019

kgholami@fiu.edu (Email address) 305-348-9935 (Phone number)

Chairperson (Dept./Div.) S.S. Iyengar (Type name) _____ (Signature) 11 / 25 / 2019

Chairperson (Curr. Comm.) Wei-Chiang Lin (Type name) _____ (Signature) 11 / 29 / 2019

College/School Dean John Volakis (Type name) _____ (Signature) 12 / 20 / 2019

Submit one original form. Attach one copy of the course justification and course syllabus, course description, objectives, major topics and textbooks.

Introduction to Cryptocurrencies - Course Justification

The Internet is designed and implemented as a tool of communication with the purpose of transferring information between smart devices. In the second era of the Internet, humans need cryptocurrency and blockchain to trade values online and place secure online transactions to do business electronically.

A cryptocurrency (or crypto currency) is a digital asset designed to work as a medium of exchange that uses strong cryptography to secure financial transactions, control the creation of additional units, and verify the transfer of assets. Cryptocurrencies use decentralized control as opposed to centralized digital currency and central banking systems.

Considering the growing importance of cryptocurrencies, there is a critical need to a course that introduce the concept of cryptocurrencies, addresses the ethical and social issues emerging in the era of cryptocurrencies, identifies the unique and new security and privacy challenges that cryptocurrency traders must deal with, and explains how they can fundamentally change e-commerce and online transactions. This undergraduate-level course will thoroughly equip students with ideas required to understand basic concepts of cryptocurrency technology and overviews a variety of security, privacy, ethical and social challenges emerging as the next-generation of computing and information systems is developed.

This new course will give our students the knowledge they need to adapt to a world and a workplace that is rapidly changing under the influence of crypto-currencies and blockchain technologies and provide them with critical understanding that is in demand in the marketplace.

School of Computing and Information Sciences

Course Title: Introduction to Crypto-currencies **Date:** 11 18 2019

Course Number: IDC-2XXX

Number of Credits: 3

Subject Area: Computer Information Systems	**Subject Area Coordinator:** Jason Liu **email:** liux *a* cis.fiu.edu
Catalog Description: High-level conceptual survey of crypto-currencies and other blockchain technologies for non-CS undergraduates, including techniques, applications, ethics and philosophical issues.	
Textbook: Andreas M. Antonopoulos. The Internet of Money: A collection of talks by Andreas M. Antonopoulos 1st Edition CreateSpace. 2016. ISBN: 978-1537000459	
References: None	
Prerequisites Courses: MAC-XXXX or MAD-XXXX or MGF-XXXX (any math course at any level)	
Corequisite Courses: None	

Type: Elective for Non-CS Majors

Prerequisites Topics:

Pre-college mathematics: functions and algebra

Course Outcomes:

1. Be familiar with crypto-currency technologies
2. Describe a selection of fundamental concepts, methods, and models used in crypto-currency and blockchain technologies
3. Explain the basic philosophical and ethical positions and concerns currently at play in the field
4. Be familiar with the principles of cryptocurrencies in online transactions and smart contracts
5. Be exposed to how blockchain can enhance security and privacy of computer systems.

Outline

Topic	Number of Lecture Hours (Total: 37.5 hours = 15 weeks * 2 lectures/week * 1.25 hrs/lecture)	Outcome
Overview of Cryptocurrencies • What is the benefit of cryptocurrencies? • Science-side vs. economy-side cryptocurrencies • CS modeling vs. business applications	5	1,2
Philosophical Issues • What is the definition of crypto-currency? • How can we determine if a crypto-currency is valuable? • How can we rank cryptocurrencies?	7	1,3
Ethical & Social Issues • Can cryptocurrency transactions be immoral? • Can cryptocurrency transactions be unethical? • What are the implications of cryptocurrency for privacy? • What are the implications of cryptocurrency for the stock market? • What are the implications of cryptocurrency for private companies? • What are the implications of cryptocurrency for society?	5.5	1,3,5
Introduction to Blockchain • Peer to peer networks • Cryptography • Digital Signature • Nodes • Hashing	10	2
Security Issues of Cryptocurrencies • Hackers and cyber-attacks • Vulnerable wallets • Selfish mining • Double Spending • 51 percent attack	10	2,5

Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
Essay assignment addressing philosophical and ethical issues	4
Homework problems addressing overview of cryptocurrencies	2
Homework problems addressing cryptography and digital signatures	2
Homework problems addressing p2p networks, nodes and hashing	2
Homework problems addressing security issues of cryptocurrencies	4

Oral and Written Communications

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
1	5	0	0

Social and Ethical Implications of Computing Topics

Topic	Class time	Student Performance Measures
Definition of cryptocurrencies	2	Essay, free-answer questions on exams.
cryptocurrencies & ethics	2	Essay, free-answer questions on exams.
cryptocurrencies & social impact	2	Essay, free-answer questions on exams.

Approximate Number of Credit Hours Devoted to Fundamental CS Topics[1]

Fundamental CS Area	Core Hours	Advanced Hours
CN – Computational Science		0.5
DS – Discrete Structures		1
IS – Intelligent Systems		0.5
SP – Social Issues and Professional Practice		1

Theoretical Contents

Topic	Class time
n/a	

Problem Analysis Experiences

None

Solution Design Experiences

None

[1] See Appendix A in *Computer Science Curricula 2013.* Final Report of the IEEE and ACM Joint Task Force, available at: https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf