

## Knight Foundation School of Computing and Information Sciences

**Course Title:** Introduction to Cryptocurrencies

**Date:** 11/18/2019

**Course Number:** IDC 2020

**Number of Credits:** 3

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

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**Outline**

Topic	Number of Lecture Hours (Total: 37.5 hours = 15 weeks * 2 lectures/week * 1.25 hrs/lecture)	Outcome
<b>Overview of Cryptocurrencies</b> <ul style="list-style-type: none"> <li>• What is the benefit of cryptocurrencies?</li> <li>• Science-side vs. economy-side cryptocurrencies</li> <li>• CS modeling vs. business applications</li> </ul>	5	1,2
<b>Philosophical Issues</b> <ul style="list-style-type: none"> <li>• What is the definition of crypto-currency?</li> <li>• How can we determine if a crypto-currency is valuable?</li> <li>• How can we rank cryptocurrencies?</li> </ul>	7	1,3
<b>Ethical &amp; Social Issues</b> <ul style="list-style-type: none"> <li>• Can cryptocurrency transactions be immoral?</li> <li>• Can cryptocurrency transactions be unethical?</li> <li>• What are the implications of cryptocurrency for privacy?</li> <li>• What are the implications of cryptocurrency for the stock market?</li> <li>• What are the implications of cryptocurrency for private companies?</li> <li>• What are the implications of cryptocurrency for society?</li> </ul>	5.5	1,3,5
<b>Introduction to Blockchain</b> <ul style="list-style-type: none"> <li>• Peer to peer networks</li> <li>• Cryptography</li> <li>• Digital Signature</li> <li>• Nodes</li> <li>• Hashing</li> </ul>	10	2
<b>Security Issues of Cryptocurrencies</b> <ul style="list-style-type: none"> <li>• Hackers and cyber-attacks</li> <li>• Vulnerable wallets</li> <li>• Selfish mining</li> <li>• Double Spending</li> <li>• 51 percent attack</li> </ul>	10	2,5

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**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.

**Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes**

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:  
<https://abet.cs.fiu.edu/csassessment/>

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**Approximate Number of Credit Hours Devoted to  
Fundamental CS Topics<sup>1</sup>**

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

**Theoretical Contents**

<b>Topic</b>	<b>Class time</b>
n/a	

**Problem Analysis Experiences**

None
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**Solution Design Experiences**

None
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<sup>1</sup> 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](https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf)