

What Does Blockchain/Bitcoin Mean for Our Students and Their Careers?

Continuing and Professional Education (CAPE)



MONTCLAIR STATE

UNIVERSITY

Continuing and Professional Education

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(Abbreviated)

Blockchain Use Cases

Mapping Skills, Competencies, and Degrees

- Manufacturing/Industrial Production
- Education: K-12
- Education: Higher Ed
- Entertainment/Media/Fine Arts
- Internet of Things (IOT)
- Gaming
- Food and Nutrition
- Healthcare-Patient Care
- Financial Services
- Energy Grid/Sustainability
- Other use cases

Manufacturing/Industrial Production

Applications

- Vendors use the blockchain to inform relevant parties of parts information, arrival etc. to aid JIT manufacturing
- Vendor provide quality control certification and test results on parts supplied
- Manufacturers provide parts usage and consumption to all vendors to ensure steady supply
- Manufactures are not limited to only local suppliers but can sourced internationally with their requirements and standards available for potential suppliers to view and bid
- Manufactures able to source for most economical parts by viewing vendors inventory and performance using information on blockchain
- Manufacturers monitor production status at each stage with information on blockchain for internal review potentially in real time.

Manufacturing/Industrial Production

Applicable Areas	<ul style="list-style-type: none">• Supply chain and vendor monitoring• Parts tracking for JIT• Quality control• Pre and post production history• Delivery and Payments
Skills Required	Logistics, Accounting, Finance, Economics, Computer Science and/or Mathematics. Legal, Auditing
Applicable MSU Degree/Programs	SBU (Accounting, Economics, Finance, International Business), CSAM (Mathematics, Com. Sci, CHSS(International Studies))

Education K-12

Applications

- Teachers degrees/qualifications stored on blockchain for easy verifications with PII not exposed except for relevant information
- School metrics and student performance available on blockchain for easy evaluation and comparison against national, state and even international standards
- Program and curriculum available for review and comparison to parents, officials and accrediting bodies in a transparent way.

Education K-12

Applicable Areas	<ul style="list-style-type: none">• Teacher Certifications and qualifications• School and student performance metrics• Programs and curriculum standards
Skills Required	Teacher Certification, Curriculum design, Statistics, Data mining, Cybersecurity, Public Policies
Applicable MSU Degree/Program	CEHS (Teacher Ed, Family & Children) CSAM(Mathematics-Statistics; Comp. Sci) CHSS(Sociology)

Higher Education

Applications

- Degree and Programs accreditations available on the blockchain to promote transparency
- Students degree and transcript available on blockchain for view with proper security measures (to safeguard student privacy). Potential employers can view with confidence that the information is authentic and authorized.
- Copyright of publications by faculty and students on blockchain to provide immutable record of ownership and ensure authenticity. Similarly student projects can be place on the blockchain to showcase the work and knowledge they gained from the courses they attended.

Higher Education

Applicable Areas	<ul style="list-style-type: none">• Program and degree accreditation• Transcripts and degrees validation• Academic credentials• Academic publications• Student work and publications
Skills Required	Teacher Certification, Curriculum design, Statistics, Programming Cybersecurity
Applicable MSU Degree/Program	CEHS (Teacher Ed.) CSAM(Mathematics-Statistics; Comp. Sci.) CHSS(Sociology; Political Sci. & Law)

Entertainment/Fine Arts

Applications

- History, ownership, authorship etc. of art work stored on blockchain to prove authenticity.
- Proof of ownership of art/music etc. on blockchain
- Tracking usage of artwork, video or music to enable capturing royalty due
- Using blockchain to immutably record art work auction such as asset history, authentication, price history etc except for ownership so as to provide privacy

Entertainment/Fine Arts

Applicable Areas	<ul style="list-style-type: none">• Copyright and ownership• Authentication• Digital marketing – music/art work• Auction
Skills Required	Fine Art/History; Legal; Music Appreciations/Composition; Marketing; Business Analytics; Auditing; Computer Sci.
Applicable MSU Degree/Program	CART(Visual Design; Product Design; Music Composition) CHSS(Law) CM(Public Relations, Marketing); CSAM(Com. Sci) SBU(Accounting, Auditing, Business Analytics)

Internet of Things (IOT)

Applications

- Provide secure channel for communication among devices using the blockchain for authentication
- Using the blockchain companies with IOT may be able to leverage the secure/authenticated channels for vertical integrations of goods and services among different companies due to the trusted nature of the ecosystem.
- IOT on blockchain can prevent cyberattacks due to the distributed network with no single point of failure

Internet of Things (IOT)

Applicable Areas	<ul style="list-style-type: none">• Enable secure communication among devices• Enable vertical integration among diverse devices across industries and companies
Skills Required	Cybersecurity, Application Programming (DAP); Digital/Telecommunications
Applicable MSU Degree/Program	CSAM(Comp. Sci; Database; Networking)

Gaming

Applications

- Gamers identity, assets are secured immutably in blockchain
- Enable multi-platform support so that gamers can utilize the same identity and share assets across gaming platforms.
- Accept different crypt-currencies for payments when transactions are handled via the blockchain. This will see wider acceptance of crypto-currencies.
- Blockchain provide a safer and more secure environment when dealing with fellow gamers across national boundaries.

Gaming

Applicable Areas	<ul style="list-style-type: none">• Gamers identity management• Authentication across different gaming eco-system• Sharing of assets across different gaming eco-system• Cheaper and easier payment for assets using smart contract and cryptocurrencies• Better security of assets in the eco-system
Skills Required	Cybersecurity, Application Programming (DAP); Digital/Telecommunications Game Design
Applicable MSU Degree/Program	CSAM(Comp. Sci., Data Analyst, Networking, Sys. Admin.); CART(Art/Product Design; Stage Design) CM(Telecommunication; Media; Film Making)

Food/Nutrition

Applicable Areas	Skills Required	Applicable MSU Degree/Program
<p>Tracking origin and source of food</p> <p>Certifications – organic, pesticide and hormone free etc.</p> <p>Freshness and sell-by dates</p> <p>Faster response to track source of food related outbreaks</p> <p>Better informed consumer</p> <p>Reduced cost to market and reduce spoilage</p>	<p>Food and nutrition science</p> <p>Biology and Chemistry</p> <p>Logistics and supply chain</p> <p>Comp. Sci.</p>	<p>CEHS(Public Health; Nutrition & Food Sci.) CSAM(Chemistry; Biology; Comp. Sci.; Database; Networking)</p> <p>SBUS(International Business; Marketing) CM(Public Relations)</p>

Examples

- Track food sources and origin
- Monitor farming practices and levels of fertilizers, medication (antibiotics) usage
- Monitor farming process from farming/gestation to harvesting and track freshness and sell-by-dates
- Provides farm-origin, nutrition and certification (eg. Organic) to better inform consumer
- Provides a faster means to track food-related outbreaks using the information in the blockchain
- Improve profitability by reducing spoilage.

Food/Nutrition

Applicable Areas

- Tracking origin and source of food
- Certifications – organic, pesticide and hormone free etc.
- Freshness and sell-by dates
- Faster response to track source of food related outbreaks
- Better informed consumer
- Reduced cost to market and reduce spoilage

Skills Required

Food and nutrition science
Biology and Chemistry
Logistics and supply chain
Comp. Sci.

Applicable MSU Degree/Program

CEHS(Public Health, Nutrition & Food Sci.)
CSAM(Chemistry, Biology, Comp. Sci.,
Mathematics/Statistics, Database; Networking)
SBUS(International Business; Marketing) CM(Public Relations)

Healthcare-Patient Care

Applications

- Patient records easily available to relevant personnel like doctors and nurses, insurers with privacy protection for patients
- Doctors and nurses able to make informed patient care with full access to patient records
- Utilizing smart contract, patient medical needs can be dispensed in a timely manner.

Healthcare-Patient Care

Applicable Areas	<ul style="list-style-type: none">• Better management of pharmacological products and usage• Timely distribution of patient records with better identity protection• Meeting patient needs timely and accurately using smart contract and access to critical patient information.• Enhance patient privacy and transparency in terms of care provided to relevant parties as information can be shared easily but with patient PII protected.
Skills Required	Nursing care; Pharmacy certification Genetics/Genomics IT knowledge; Cybersecurity
Applicable MSU Degree/Program	CSAM(Comp. Sci., Database; Networking); SON(Nursing Care, IT & Nursing, Genetics/Genomics) CEHS(Nutrition, Public Health)

Financial Services

Examples

- Blockchain as a distributed network has no single point of failure so financial trading can proceed. Should one node or multiple nodes fail, the rest of the nodes can continue processing transactions.
- Secure and immutable records of customer transactions helps in regulatory reporting and fraud prevention as well as enhance KYC policy thru transparency of each customer source of funds and transactions.
- Customers information, assets are not kept in one central place and only relevant customer information are exposed as needed thereby enhancing privacy and security
- Faster transactions and the elimination of intermediary means lower transaction costs and faster thru-put.
- Blockchain will help bring Third World people gain access to the financial services as it lowers the cost of entry. Poorer countries do not have to invest in massive hardware infrastructure as most transactions can be done wirelessly.

Financial Services

Applicable Areas	<ul style="list-style-type: none">• Faster, more secure payment systems with no-single failure point• KYC and ease of regulatory reporting• Asset and customer security and privacy• Lower transaction and operations costs for firms and individuals
Skills Required	Finance, Accounting, Economics, Comp. Sci., Cybersecurity, Legal, Business Analytics
Applicable MSU Degree/Program	SBU(Finance, Economics, Accounting, International Business, Business Analytics) CSAM(Mathematics, Comp. Sci.) CHSS(Law)

Energy Grid and Green Energy

Applications

- Blockchain enable cheaper and faster trading of energy certificates between producers and energy companies without going through a third party for verification. Blockchain consensus algorithm will be able to provide the service cheaper and faster.
- Producers (home solar grid) and energy companies will be able to benefit from lower their transaction costs using the automated consensus algorithm.
- Blockchain also will open up the energy market to small scale energy producers. Instead of selling their energy to only one or two energy companies, blockchain will open up access to multiple producers in different parts of the country. Producers can sell off excess to the energy companies instead of shutting down their grid when there is excess production locally.

Energy Grid and Green Energy

Applicable Areas	<ul style="list-style-type: none">• Blockchain based payment and verifications methods• Opens up market for producer by bringing in multiple energy companies across the countries• Lower the cost of transaction by verifying transactions through the network consensus algorithm.
Skills Required	Finance, Accounting, Economics, Comp. Sci., Cybersecurity, Legal, Business Analytics, Statistics
Applicable MSU Degree/Program	SBU(Finance, Economics, Accounting, International Business, Business Analytics) CSAM(Mathematics, Comp. Sci.) CHSS(Law)

Other Use Cases

Consumer	Government	Technology	Public Service
Retail Real Estate Insurance Travel/Tourism Credit History Loans Wills and Inheritance	Personal Identity Voting Titles and Deeds Law Enforcements	Cloud Storage Cybersecurity	Charity Animal Welfare