# ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ

ವಿಟಿಯುಅಧಿನಿಯಮ೧೯೯೪ರಅಡಿಯಲ್ಲಿಕರ್ನಾಟಕಸರ್ಕಾರದಿಂದಸ್ಥಾಪಿತವಾದರಾಜ್ಯವಿಶ್ವವಿದ್ಯಾಲಯ

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

State University of Government of Karnataka Established as per the VTU Act, 1994"JnanaSangama" Belagavi-590018, Karnataka, India

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DATE: 3 JAN 2024

## CIRCULAR

**Subject:** Updated Syllabus of the course /subject 22MCA331-Block Chain Technology ...

**Reference:** Approved by the Chairpersons BoS VTU Belagavi vide email dated 02.01.2023.
The Hon'ble Vice-Chancellor's approval Dated 03.01.2023

The syllabus for the MCA program's course/subject 22MCA331-Block Chain Technology has been amended to align with the recommended textbook's content based on stakeholders' input. It is attached to this circular for the benefit of all stakeholders involved.

All the Principals of Engineering Colleges and Chairpersons /Program coordinators of University departments where the MCA program is being offered are informed to update this information to all concerned.

Further, for any clarification send the email to **chair.cse@vtu.ac.in / sbhalbhavi@vtu.ac.in**

Sd/-
REGISTRAR

To,

1. All the Principals of all affiliated, constituent Engineering Colleges are under the ambit of the university.
2. The Chairpersons /Program Coordinator of the University departments at Kalaburagi, Mysuru Belagavi, and Muddenahalli Bengaluru

CC:

- The Hon'ble Vice-Chancellor through the secretary to VC for information
- The Registrar (Evaluation) for information and needful
- The Dean Faculty of Engineering, VTU Belagavi for information
- The Director ITI, SMU VTU Belagavi for information and request to upload the circular on the VTU web portal.
- The Office copy

Ray 03/01/24
REGISTRAR

Semester- III

| Block chain Technology | | | |
|---|---|---|---|
| Course Code | 22MCA331 | CIE Marks | 50 |
| Teaching Hours/Week (L:P:SDA) | 2:0:0:2 | SEE Marks | 50 |
| Total Hours of Pedagogy | 40 | Total Marks | 100 |
| Credits | 03 | Exam Hours | 03 |

**Course Learning objectives:**

- Explain the basics of Block chain concepts.
- Illustrate the working of Blockhain.
- Explore working of Bitcoin.
- Exemplify the Ethereum Working.
- Illustrate DApps working.

| Module-1 | |
|---|---|
| Introduction to Block chain: Backstory of Blockchain ,What is Blockchain?, Centralized vs. Decentralized Systems Centralized Systems, Decentralized Systems, Layers of Blockchain, Application Layer, Execution Layer, Semantic Layer, Propagation Layer, Consensus Layer, Why is Blockchain Important?, Limitations of Centralized Systems, Blockchain Adoption So Far, Blockchain Uses and Use Cases | |
| **Teaching-Learning Process** | Chalk and Talk/PPT/Web Content |

| Module-2 | |
|---|---|
| How Block chain works: Laying the Blockchain Foundation, Cryptography Symmetric Key Cryptography ,Cryptographic Hash Functions, MAC and HMAC, Asymmetric Key Cryptography, Diffie-Hellman Key Exchange, Symmetric vs. Asymmetric Key Cryptography, Computer Science Engineering, The Blockchain, Merkle Trees | |
| **Teaching-Learning Process** | Chalk and Talk/PPT/Web Content |

| Module-3 | |
|---|---|
| How Bitcoin Works: The History of Money,, Dawn of Bitcoin, What Is Bitcoin?, Working with Bitcoins<br>The Bitcoin Blockchain, Block Structure, The Genesis Block, The Bitcoin Network, Network Discovery for a New Node, Bitcoin Transactions, Consensus and Block Mining, Block Propagation | |
| **Teaching-Learning Process** | Chalk and Talk/PPT/Web Content |

| Module-4 | |
|---|---|
| How Ethereum Works: From Bitcoin to Ethereum, Ethereum as a Next-Gen Blockchain, Design Philosophy of Ethereum, Enter the Ethereum Blockchain, Ethereum Blockchain, Ethereum Accounts, Trie Usage<br>Merkle Patricia Tree, RLP Encoding, Ethereum Transaction and Message Structure, Ethereum State Transaction Function,Gas and Transaction Cost, Ethereum Smart Contracts, Contract Creation, Ethereum Virtual Machine and Code Execution, Ethereum Ecosystem, Swarm, Whisper, DApp, Development Components | |
| **Teaching-Learning Process** | Chalk and Talk/PPT/Web Content |

| Module-5 | |
|---|---|
| Building an Ethereum DApp: The DApp, Setting Up a Private Ethereum Network, Install go-ethereum (geth),Create geth Data Directory, Create a geth Account, Create genesis.json Configuration File, Run the First Node of the Private Network, Run the Second Node of the Network, Creating the Smart Contract ,Deploying the Smart Contract<br>Setting up web3 Library and Connection, Deploy the Contract to the Private Network, Client Application | |
| **Teaching-Learning Process** | Chalk and Talk/PPT/Web Content |

## Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

### Continuous Internal Evaluation:

- Three Unit Tests each of **20 Marks**
- Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

**CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.**

### Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
- Each full question will have a sub-question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

**Suggested Learning Resources:**

**Books**

- Beginning Block chain: A Beginner's Guide to Building Bleckchain Solutions by ArshdeepBikramaditya Signal, Gautam Dhameja (Priyansu Sekhar Panda., A Press.) 2018

**Reference Books**

- Bitcoin and Cryptocurrency Technologies by Aravind Narayan, Joseph Bonneau, princton
- Bitcoin and Blockchain Basics: A non-technical introduction for beginners by Arthu.T Books.
- Block chain Applications: A Hands-On Approach by Bahga, Vijay Madisetti .2017
- Block chain by Melanie Swan, OReilly 2015

**Web links and Video Lectures (e-Resources):**

- https://youtu.be/mzPoUjQC4WU

**Skill Development Activity**

The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

**Course outcome (Course Skill Set)**

At the end of the course the student will be able to :

| Sl. No. | Description | Blooms Level |
|---|---|---|
| CO1 | Demonstrate the basics of Block chain concepts using modern tools/technologies. | L2 |
| CO2 | Analyze the role of block chain applications in different domains including cyber security. | L3 |
| CO3 | Explore the Bitcoin working with Consensus | L2 |
| CO4 | Exemplify the usage of Ethereum and its impact on the economy | L2 |
| CO5 | Demonstrate building an Ethereum DApp | L2 |

Mapping of COS and POs

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | | | | | | | | | | | |
| CO2 | X | | | | | | | | | X | | |
| CO3 | | | X | | | | | X | | | | |
| CO4 | X | | | | | | | | X | | | |
| CO5 | | | X | | | | | | | | | |