



PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)

(Estd. Under the Panjab University Act VII of 1947—enacted by the Govt. of India)

SYLLABI

FOR

**Undergraduate Programme
Value Added Courses**

**(offered by Computer Science and Application)
(SEMESTER SYSTEM)**

EXAMINATIONS, 2025-26

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**VAC (Multi-Faculty Departments) Subjects of
Computer Science & Applications**

Paper Title: Introduction to Blockchain Technology
Paper Code: CSA-VAC-101/201/301/401
(Any Semester)

Th	Pr	Cr
2	--	2

Theory External Marks-45
Theory Internal Marks-05
Contact hours- 30

Level: L-100

Time Duration: 3 hours

Note :

- i. The Question Paper will consist of Three Sections.
- ii. Examiner will set total of Seven questions comprising THREE questions from each Section I and II; and last section include ONE compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt TWO questions from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

Objectives:

To enable the students to learn about Blockchain Technology.

Learning Outcomes:

- Understanding of what Blockchain is and why it is used.
- Explanation of the different components involved within Blockchain, its application areas and Introduction of Cryptography.

UNIT-I

History of Blockchain, Terminologies in Blockchain, Types of Blockchain, Applications of Blockchain, How blockchain works, Ingredients of Blockchain. Various types of Blockchain and its real time applications.

Introduction to cryptography-Encryption and Decryption, Ciphers

UNIT II

Introduction to Consensus Methods - Proof of Work(PoW), Proof of Stake(PoS), Block chain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system / social welfare systems. Block chain Cryptography: Privacy and Security on Block chain.

References:

1. Mark Gates, "Block chain: Ultimate guide to understanding block chain, bitcoin, crypto currencies, smart contracts and the future of money", Wise Fox Publishing and Mark Gates 2017.
2. Bahga, Vijay Madisetti, "Block chain Applications: A Hands-On Approach", ArshdeepBahga, Vijay Madisetti publishers 2017.

Paper Title: Introduction to Computer Hardware

Paper Code: CSA-VAC-102/202/302/402

(Any Semester)

Th	Pr	Cr
2	--	2

Theory External Marks-45

Theory Internal Marks-05

Contact hours- 30

Level: L-100

Time Duration: 3 hours

Note :

- The Question Paper will consist of Three Sections.
- Examiner will set total of Seven questions comprising THREE questions from each Section I and II; and ONE compulsory question of short answer type covering whole syllabi.
- The students are required to attempt TWO questions from each Section I and II and the Compulsory question.
- All questions carry equal marks unless specified.

Objectives:

To enable the students to learn about hardware fundamentals.

Learning Outcomes:

- Recognition of the fundamental hardware components that make up a computer's hardware.
- Introduction to the names and functions of hardware ports and the parts of the motherboard.
- Knowledge of Windows installation and Role of Anti-Virus.

UNIT-I

Introduction to computer hardware: Definition, Peripheral devices of a Computer system, Add On cards: network interface card, sound card and graphics card, functional description of various parts of a PC, UPS, Types of UPS: offline, online and line interactive UPS Various Components of a PC: MotherBoard: Types of Motherboard AT, ATX, and BTX. Ports: Types of Ports, serial and parallel ports. Hard Disk: Types of Hard Disk: PATA, SATA, SCSI. RAM: Types of RAM: SRAM, DRAM, SDRAM, Power supply unit, cabinet, Processor.

UNIT-II

BIOS: Introduction, Connecting & disconnecting computer peripherals and components, Mouse, Keyboard, Monitor, Hard Disk. Window installation, Hard disk: partitioning and formatting, creating, formatting and deleting partitions using DISKPART in Command Prompt and Graphical User Interface. Antivirus: features and Significance, Installing third party application. Firewall: Introduction to firewall, Features of firewall.

References:

1. Govindarajulu, B., IBM-PC and Clones – Hardware Troubleshooting and Maintenance, Tata McGraw Hill, 2nd ed. N.D.
2. Basandra, S. K., Computers Today, Galgotia Publications
3. Craig Zacker., The Complete Reference: PC Hardware, TMH Publication

Paper Title: Digital Empowerment
Paper Code: CSA-VAC-103/203/303/403

(Any Semester)

Th	Pr	Cr
2	--	2

Theory External Marks-45
Theory Internal Marks-5

Level: L-100

Time Duration: 3 hours

Contact Hours- 30

Note:

- i. The Question Paper will consist of 3 Sections.
- ii. The examiner will set five questions, two from each Section and one compulsory short-answer question covering the whole syllabus.
- iii. The students are required to attempt ONE question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

Course Objective:

1. To understand the digital world and the need for digital empowerment.
2. To create awareness about Digital India.
3. To explore, communicate, and collaborate in cyberspace.
4. To impart awareness of cyber safety and security.

Learning Outcome: By the end of this course, students should be able to:

1. Use ICT and digital services in daily life.
2. Develop skills to communicate and collaborate in cyberspace using social platforms, and teaching/learning tools.
3. Understand the significance of security and privacy in the digital world.
4. Evaluate ethical issues in the cyber world

Unit-1

Digital Inclusion and Empowerment: Needs and Challenges, Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services), and e-Health Campaigns.

Communication and Collaboration in the Cyberspace: Electronic mail, blogs, social media, Collaborative Digital platforms, Tools/platforms for online learning, Collaboration using file sharing, messaging, video conferencing.

Unit-II

Towards Safe and Secure Cyberspace: Online Security and Privacy, Threats in the Digital World: Data Breach and Cyber Attacks, Blockchain Technology, Security Initiatives by the Govt of India.

Ethical Issues in the Digital World: Netiquettes, Ethics in Digital Communication, Ethics in Cyberspace

Recommended Books and Readings:

1. David Sutton. "Cyber security: A practitioner's guide", BCS Learning & Development Limited, UK, 2017.
2. Mahendra Pal Singh, V.N. Shukla's Constitution of India, (Eastern Book Company, Lucknow, 13th revised edn. 2017).
3. Rodney Jones and Christoph Hafner. "Understanding digital literacies: A practical
4. Introduction". Routledge Books, 2nd edition, 2021.

Paper Title: Ethics of Artificial Intelligence
Paper Code: CSA-VAC-104/204/304/404
(Any Semester)

Th	Pr	Cr
2	--	2

Theory External Marks-45
Theory Internal Marks-5

Level: L-100
Time Duration: 3 hours

Theory Hours- 30

Note:

- i. The Question Paper will consist of 3 Sections.
- ii. The examiner will set five questions, two from each Section and one compulsory short-answer question covering the whole syllabus.
- iii. The students are required to attempt ONE question from each Section and the Compulsory question.
- iv. All questions carry equal marks unless specified.

Course Objective:

1. To introduce students to the ethical considerations surrounding developing and deploying artificial intelligence technologies.
2. To provide an understanding of the role of ethics in AI and its implications for human life.
3. To explore various frameworks, models, and perspectives used to govern AI systems and ensure their alignment with human rights and ethical principles.
4. To analyze real-world cases and applications of AI ethics across different domains including transportation, military, healthcare, education, policy, and smart cities.

Learning Outcome: By the end of this course, students should be able to:

1. Define and explain the significance of ethics in the context of artificial intelligence.
2. Identify and evaluate ethical considerations inherent in the development and deployment of AI technologies.
3. Analyze the ethical implications of AI on accountability, transparency, and responsibility within computer systems.

Unit-1

Introduction: Artificial Intelligence, Understanding Ethics, Introduction to AI Ethics, Role of AI in Human Life, Ethical Considerations of AI, Current Initiatives in AI and Ethics, Ethical Issues with our Relationship with Artificial Entities.

Framework and Models: AI Governance by Human-Right Centered Design, Normative Models, Role of Professional Norms, Teaching Machines to be Moral.

Unit-II

Concepts and Issues: Accountability in Computer Systems, Transparency, Responsibility and AI. Race and Gender, AI as a Moral Right-holder.

Perspectives and Approaches: Perspectives on Ethics of AI, Integrating Ethical Values and Economic Value, Automating Origination, Machine Learning Values, Artificial Moral Agent.

Application Ethics of AI: Application Ethics of AI in Transport, Ethical AI in Military, Biomedical Research, Patient Care, Public Health, Robot Teaching, Pedagogy, Policy, and Smart City Ethics.

Recommended Books and Readings:

1. S. Matthew Liao, “Ethics of Artificial Intelligence”, Oxford University Press Edited Book, 2020
2. Wallach, W., & Allen, C, “Moral machines: Teaching robots right from wrong”, Oxford University Press, 2008.
3. Markus D. Dubber, Frank Pasquale, Sunit Das, “The Oxford Handbook of Ethics of AI”, Oxford University Press Edited book, 2020
4. Paula Boddington, “Towards a Code of Ethics for Artificial Intelligence”, Springer, 2017