

ITDB — Information Technology & Digital Banking

Complete Book | Table of Contents | 20 chapters + 4 sections

Module A — Introduction to Information Technology

CH-1	Information Technology and its Implications	2
CH-2	Introduction to Computing	4
CH-3	Introduction to Software	7
CH-4	Networking Systems	9

Module B — Systems and Design

CH-5	Introduction to Information Systems	13
CH-6	Database Management Systems	17
CH-7	Data Warehousing and Data Mining	20

Module C — Applications in Banking

CH-8	E-Learning Environment	22
CH-9	Banking Software	25
CH-10	Electronic Clearing and Settlement Systems	28
CH-11	Plastic Money	32
CH-12	Electronic Commerce and Banking	34
CH-13	IT Act 2000, 2008	37
CH-14	Emerging Technologies	40

Module D — Security, Controls and Guidelines

CH-15	Computer Security	43
CH-16	Communication Security	46
CH-17	Business Continuity and Disaster Recovery planning	49
CH-18	Information System Audit	52
CH-19	Competitive Bid Process – RFP and SLA	56
CH-20	RBI Guidelines on Cyber Security (2016) & Digital Payment Security (2021)	59

Additional Resources

—	Case Studies — Module A: Introduction to Information Technology	62
—	Case Studies — Module B: Systems and Design	66
—	Case Studies — Module C: Applications in Banking	72
—	Case Studies — Module D: Security, Controls and Guidelines	81

CH-1

Information Technology and its Implications

Topic 1 — Information Technology

- **Meaning** — **Information Technology (IT)** is the use of computers, storage, networking and other physical devices.
- **Scope** — It also covers the infrastructure and processes used to **create, process, store, secure and exchange** all forms of electronic data.

Topic 2 — Impact of Information Technology

Area	Impact
General	People use computers to take more decisions; a system answers on preselected criteria . Entertainment and information resources of the world are accessible at home. People increasingly work from home and while travelling.
General (home and travel)	Homes become more comfortable, economical and secure (hidden video cameras, automatic garden sprinklers). Self-driven cars use infrared cameras and microprocessor-based sensors that alert the driver.
Business and economy	Cyber technologies automate production (robotic mining and farming machines feed automated factories). IT can raise productivity and living standards. Gains are not guaranteed or evenly shared ; they depend on skills, access, institutions.
Business and economy (markets)	IT creates both rich and poor; some people lose jobs. Businesses reach new markets, marketing costs fall and consumer satisfaction rises. E-commerce removes geographical barriers: buy anytime, from anywhere.
Money	Bills are paid and stocks bought from home. Smart cards and apps pay for small purchases; smart cards also hold medical data and shopping accounts. E-banking supports cross-border services, but FEMA, KYC, tax and foreign laws still apply.
Government	Laws, regulations, policies and party positions become routinely available on networks. Electronic systems allow more citizen input ; citizens can be quickly polled and their views added to those of experts.

Topic 3 — Strategic Issues and IT

Strategic issue	What it means for banks
Increased competition	Fierce competition from non-traditional competitors entering the market and alternatives to traditional financial products.
Changing consumer behaviour	Growing demand for convenience and round-the-clock availability from home, office or shops via telephone, PCs and mobile phones.
Improved financial performance	Investors are better informed about opportunities, risks and alternatives, and expect better performance from financial institutions.

Topic 4 — Internet Banking

- **Meaning** — **Internet (online) banking** delivers banking services through an **open-access computer network**.

- **Availability** — Customers can use it **at any time and from any place**.
- **Devices** — It works on a PC, a mobile phone with a browser, or desktop software.

Benefits for customers	Benefits for banks
Less waiting time — removes time and place limits.	Increased profitability — services delivered at far lower cost than branch banking.
Ease and convenience — transact from the comfort of home.	Cost-effective — lower administrative cost and paperwork.
Self-service channel — no dependence on bank staff.	Reach where there is no branch — service areas without branches.
Saves time and money — saves fuel, avoids traffic, reduces vehicle use (environment).	Better customer relationship — high-quality service builds lasting relationships.

Topic 5 — Mobile Banking

- **Meaning** — **Mobile banking** lets customers conduct financial transactions remotely using a **mobile phone or tablet**.
- **Bank apps** — Mobile banking apps are provided by banks.
- **Other UPI apps** — UPI apps also include **BHIM** and third-party providers such as PhonePe and Google Pay.
- **Not bank apps** — These third-party UPI apps are **not bank apps**.

Mobile banking is **not restricted to smartphones**. NPCI offers mobile banking on the **National Unified USSD Platform (NUUP)** through the short code ***99#**, usable on basic feature phones without internet.

Remember this

- USSD mobile banking short code: ***99#** (NUUP, run by NPCI).

Topic 6 — Government Initiatives for E-Banking

- **Information Technology Act, 2000** gives legal recognition to electronic transactions and e-commerce. It remains the governing cyber law; the proposed Digital India Act has not replaced it.
- **Digital Personal Data Protection Act, 2023** and the **DPDP Rules, 2025** govern processing of customers' digital personal data, with phased implementation.
- **RBI** monitors and reviews the legal requirements of e-banking continuously. The **IT Vision Document 2011-17** was an earlier framework; today's controls follow RBI's directions on **IT governance, risk, controls and assurance practices** and on **cyber security**.
- **NPCI** keeps adding mobile banking services and widening **IMPS** channels.

Topic 7 — NPCI and Unified Payments Interface

- **Nature** — **National Payments Corporation of India (NPCI)** is a **not-for-profit** company.
- **Legal form** — It is a **Section 8 company** under the **Companies Act, 2013** (originally Section 25 of the 1956 Act).
- **Promoters** — It is promoted by **RBI and the Indian Banks' Association (IBA)**.

Unified Payments Interface (UPI) is an **instant, real-time** payment system developed by NPCI and **regulated by RBI**.

UPI indicator (NPCI data)	Latest position
Monthly volume – September 2026	24.07 billion transactions (about 802 million per day)
Monthly value – September 2026	about ₹29.37 lakh crore
Previous month – August 2026	24,508.96 million transactions; ₹29,82,355.95 crore
Banks live on UPI (August 2026)	752

Transaction volumes are **counts of transactions, not users**.

Merchant Discount Rate (MDR) on UPI from 15 October 2026

- **Charged** — Person-to-merchant (P2M) payments **above ₹2,000** attract MDR of **0.40%**.
- **Cap** — The MDR is capped at **₹300** per transaction.
- **Borne by** — The **merchant** pays the MDR, not the customer.
- **Zero MDR** — P2M payments up to ₹2,000, **P2P transfers** and eligible **small merchants** remain at zero MDR.

Example: A customer pays ₹10,000 by UPI to a large merchant: $\text{MDR} = 0.40\% \times 10,000 = ₹40$, charged to the merchant. On ₹1,00,000 the 0.40% works out to ₹400, so the **₹300 cap** applies.

Remember this

- UPI MDR: **0.40%**, only P2M **above ₹2,000**, cap **₹300**; P2P free.
- **See** — Ch 10 (p. 28) for NPCI's role under the Payment and Settlement Systems Act, its products (IMPS, RuPay, AePS, NFS, BBPS, NETC, Bharat QR, BHIM, NACH) and UPI transaction limits.

Topic 8 — Web Consumers

A **web consumer** is any **natural person** who places an order for goods and/or services on a supplier's website.

- Saves time and effort; shopping from home.
- Wide variety of products; good discounts and lower prices.
- Detailed product information; easy comparison of models and brands.

Topic 9 — Technology-Based Workforce and Work from Home

As e-commerce replaces conventional sales and services, more jobs require **IT skills** and **higher-level cognitive reasoning**.

Aspect	Effect
Composition of workforce	Jobs shift from distributing products to transferring information .
Workforce flexibility	Employees can be productive no matter when or where they work.
Globalization	The Internet has no national borders; physical proximity is no longer key, and tasks can be done by workers anywhere in the world.
Work from Home (WFH)	Work done remotely instead of at an office. The greatest challenge is securing the connection between the employee and the organisation's internal network over the Internet.

Topic 10 — Information Technology Act, 2000

- Facilitates **e-governance and e-commerce** by giving equal legal treatment to users.
- Gives **electronic records** legal recognition, subject to statutory conditions and exclusions.
- **See** — Ch 13 (p. 37) for the sections, offences, penalties and amendments of the IT Act, 2000.

ITDB | Module A | CH-1 | MCQs

Q1. A bank's customer in a village with no branch uses a basic feature phone without internet. Which channel lets him check his balance and transfer funds? [Ref: Topic 5, p. 2]

- (a) Internet banking through a browser
- (b) *99# USSD service on NUUP
- (c) UPI app on a smartphone
- (d) Desktop banking software

Q2. Which statement on the National Payments Corporation of India is correct? [Ref: Topic 7, p. 2]

- (a) It is a for-profit listed company owned by the Government
- (b) It is a statutory body created by an Act of Parliament
- (c) It is a not-for-profit Section 8 company promoted by RBI and IBA
- (d) It is a department of the Ministry of Finance

Q3. A large merchant receives a UPI payment of ₹50,000 from a customer after 15 October 2026. What MDR applies? [Ref: Topic 7, p. 2]

- (a) Nil, UPI is always free
- (b) ₹200, paid by the customer
- (c) ₹300, paid by the merchant
- (d) ₹200, paid by the merchant

Q4. A customer transfers ₹25,000 by UPI to a friend's bank account. The MDR applicable is: [Ref: Topic 7, p. 2]

- (a) Nil, as it is a P2P transfer
- (b) 0.40% of ₹25,000
- (c) ₹300 flat
- (d) 0.40% capped at ₹300, paid by the sender

Q5. A bank is losing young customers to fintech firms and payment companies offering similar products. This strategic issue is best described as: [Ref: Topic 3, p. 2]

- (a) Improved financial performance
- (b) Increased competition from non-traditional players
- (c) Changing government policy
- (d) Globalisation of the workforce

Q6. Which benefit of internet banking accrues mainly to the bank rather than to the customer? [Ref: Topic 4, p. 2]

- (a) Less waiting time
- (b) Self-service convenience
- (c) Lower administrative cost and paperwork
- (d) Saving fuel and travel time

Q7. An Indian resident uses internet banking to make a payment to a foreign supplier. Which statement is correct? [Ref: Topic 2, p. 2]

- (a) Global access removes the need for FEMA compliance
- (b) KYC is not required for online payments
- (c) Only the foreign country's law applies
- (d) FEMA, KYC, tax and the other country's laws still apply

Q8. Which law gives legal recognition to electronic records and electronic business transactions in India? [Ref: Topic 10, p. 3]

- (a) Information Technology Act, 2000
- (b) Payment and Settlement Systems Act, 2007
- (c) Banking Regulation Act, 1949
- (d) Indian Contract Act, 1872

Q9. As per the chapter, a 'web consumer' is: [Ref: Topic 8, p. 3]

- (a) Any company buying goods in bulk online
- (b) A natural person who places an order for goods or services on a supplier's website
- (c) A bank customer using internet banking
- (d) A merchant selling on an e-commerce portal

Q10. A bank allows its officers to work from home. What is the greatest challenge it faces? [Ref: Topic 9, p. 3]

- (a) Higher fuel cost for employees
- (b) Lack of office furniture
- (c) Securing the connection between the employee and the bank's internal network
- (d) Inability to measure attendance

Q11. UPI recorded about 24 billion transactions in a month. What does this figure represent? [Ref: Topic 7, p. 2]

- (a) Number of unique users
- (b) Number of bank accounts linked
- (c) Number of merchants live
- (d) Number of transactions processed

Q12. Which statement on the impact of IT on business and economy is correct? [Ref: Topic 2, p. 2]

- (a) IT gains depend on skills, access and institutional conditions
- (b) IT always distributes gains equally to all
- (c) IT cannot cause any job loss
- (d) E-commerce increases geographical barriers

Answer key

Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	b	4	a	7	d	10	c
2	c	5	b	8	a	11	d
3	d	6	c	9	b	12	a

CH-2 Introduction to Computing

Topic 1 — Computer and its Functioning

A **computer** is an electronic machine that converts **raw facts into required information** according to a set of instructions fed into it. It works by combining **input, storage, processing and output**.

Function	Role
Input	Information the user provides to the computer.
Storage	Computer memory , where input is kept.
Processing	Done by the Central Processing Unit (CPU) .
Output	Any information processed by and sent out from the computer or device.

Topic 2 — Central Processing Unit

The **CPU** performs all data processing operations and **controls the operation of all parts** of the computer. It uses **registers and cache** internally, while **main memory** stores programs and data.

Component of CPU	Function
Registers and cache	Very fast storage inside the CPU for data and instructions in use.
Control Unit (CU)	Directs and co-ordinates the sequence of operations.
Arithmetic Logic Unit (ALU)	Performs arithmetic and logical operations.

Topic 3 — Organisation of a Computer

Charles Babbage conceived the **Analytical Engine** as a general-purpose programmable machine. It was never completed in his lifetime, but its parts mirror a modern computer.

Engine component	Function	Modern equivalent
Store	Held numbers and intermediate results	Memory
Arithmetic unit (mill)	Performed arithmetic on stored numbers	ALU
Control unit	Checked correct sequence of operations, e.g. transfer between mill and store	Control unit
Input device	Entered numbers and instructions (punched cards)	Input device
Output device	Displayed results	Output device

Topic 4 — Generations of Computers

Generations refer mainly to changes in **hardware technology**.

Generation	Technology	Key features
First (1940-50)	Vacuum tubes	Limited memory; speeds varied widely. The stored-program architecture was described in the EDVAC report.
Second (1950-60)	Transistors	More reliable than tubes; magnetic core storage ; languages FORTAN and COBOL developed.
Third (1960-70)	Integrated Circuits (ICs)	Transistors, resistors and capacitors on one silicon chip; smaller minicomputers ; better reliability and speed.
Fourth (1970-present)	Microprocessor	Semiconductor memory such as RAM and ROM introduced.
Fifth (present)	VLSI and AI	Very large numbers of transistors on one chip; AI-oriented systems. Natural-language processing is an AI capability, not a property of every computer.

Remember this

- Tubes → Transistors → ICs → Microprocessor → VLSI/AI.