Micro-Syllabus and Model Question

Course Title: Introduction to Information Technology
Course No: BIT101
Nature of the Course: Theory + Lab
Semester: I

Full Marks: 60+20+20
Pass marks: 24+8+8
Credit Hours: 3

Course Description: This course covers basic concepts of computers, computer hardware, memory, input/output devices, computer software, data representation, database, computer networks, internet, computer security and applications of IT.
Course Objectives: The main objective of this course is to provide basic knowledge of fundamental concepts of computer system and Information Technology.
Teaching Methods:
The methods and activities of teaching by faculties for this course includes **class lectures**, **group discussions**, **case studies**, **assignments** (theoretical and Practical), **written and verbal examinations**. Create environment where students can update and upgrade themselves with the help of topics listed in the syllabus.

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Unit-01: Introduction to Computer		**Chapter-1**		4 Hrs.
Introduction of Computer	Definition and use of computers.	1.1	Class Lecture	1
Characteristics of Computer	Characteristics of computer (Speed, accuracy, diligence, storage capability, versatility)	1.3	Class Lecture	
History of Computer	History of computing of how computers evolved from their humble beginnings to the machines of today.	1.4	Class Lecture	1
Generations of Computer	Generations of computers from first to fifth with varying hardware and software technologies.	1.5	Class Lecture	
Digital and Analog Computers	Definition and uses of digital and analog computers with example. Differences between digital, analog and hybrid computers.	1.2	Class Lecture	1
Classification of Computer based on size	Classification of computers based on size and type: super-computer, mainframe-computer, minicomputer, micro-computer. Characteristics of each class.	1.6	Class Lecture	
The Computer System	The computer system and their components (Hardware, software, data, users)	1.7	Class Lecture	1
Application of Computers	Applications of computers in different sectors like education, health, agriculture, entertainment, scientific research, sports etc.	1.8	Class lecture /Group Discussion	
Unit-02: Computer Hardware		**Chapter-2**		8 Hrs.
A. Introduction		2.1	Class Lecture	1

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Central Processing Unit; Components of CPU	CPU and its functions. Different components of CPU (arithmetic logic unit, registers, control unit)	2.2	Class Lecture	
Instruction Format	What is instruction format? Concept of operation code and operand code.	2.4	Class Lecture	1
Instruction Set	Definition and example of instruction set.	2.5	Class Lecture	
Instruction Cycle	What is Instruction cycle? Fetching, decoding, executing, and storing steps of instruction cycle.	2.6	Class Lecture	
Microprocessor	RISC and CISC based architecture. Concept of pipeline and parallel processing.	2.7	Class Lecture	1
Computer Bus	Concept and types of bus. Concept of expansion slots and ports.	2.8	Class Lecture	1
Components of Computer Cabinet (Power Supply, Motherboard, memory chips, expansion slots, ports and interface, processor, cables and Storage devices)	Different components inside a computer cabinet like motherboard, ports and interfaces, expansion slots, memory chips, processor, hard disk etc.	2.10	Class Lecture	
B. Computer memory		**Chapter-3**		
Memory Representation	Description of bit, byte, kilobyte, megabyte, gigabyte and terabyte and Concept of memory organization as a linear array of locations for storing data.	3.2	Class Lecture	1
Memory Hierarchy	Memory hierarchy from registers to magnetic tape.	3.3	Class Lecture	
CPU Register	Description of CPU registers as working memory.	3.4	Class Lecture	
Cache Memory	Description cache memory and its levels.	3.5	Class Lecture	
Primary Memory (RAM, ROM)	What is primary memory? Different types of primary memory.	3.6	Class Lecture	
Secondary Memory (Magnetic Tape; Magnetic Disk; Optical Disk; Magneto-Optical Disk, Flash Memory Device)	Secondary memory and their types. Working characteristics and features of Magnetic Tape, Magnetic Disk, Optical Disk, Magneto-Optical Disk, Flash Memory Device	3.7	Class Lecture	1

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Access types of storage devices (sequential and direct)	Definition and characteristics of Sequential access and direct access devices.	3.8	Class Lecture	
C. Input and Output Devices		**Chapter-4**		
Input-Output Unit;	Definition, uses of input/output devices and how it works.	4.2	Class Lecture	1
Input Devices (Human Data Entry Devices; Source Data Entry Devices)	○ Definition of Human Data Entry Devices and Source Data Entry Devices. ○ Features and description of Human data entry devices (Keyboard, pointing devices—Mouse, trackball, joystick, digitizing tablet, Pick devices—Light pen, touch screen) ○ Features and description of Source data entry devices (Audio input device (microphone, sound card, speech recognition), Video input device (video camera, digital camera), Optical input devices—Scanner (hand held, flat bed), OCR, MICR, OMR, barcode reader	4.3, 4.4, 4.5	Class Lecture	
Output Devices (Hard copy devices; Soft copy devices)	Definition, uses of output devices and how it works. Classification and functional details of Output devices (Hard copy and soft copy devices).	4.6	Class Lecture	
I/O Port	Use of I/O ports, types I/O ports	4.7	Class Lecture	1
I/O System	Explain the working of I/O system—I/O devices, device controller, device driver, Application Programs.	4.8	Class Lecture	
Unit-03: Computer Software		**Chapter-6**		6 Hrs.
A. Introduction		6.1	Class Lecture	1
Types of Software	Classification of software (System software and Application software).	6.2	Class Lecture	
System Software	Functionality and purpose of system software	6.3	Class Lecture	
Device Drivers and Utility software	Function and example of Device Drivers and Utility software.	6.3.2 and 6.3.3	Class Lecture	
Programming Languages	Definition and categories of Programming Languages. Different Generations of Programming Languages.	6.3.4	Class Lecture	
Language Translators: assembler, compiler	Different kind of translator software (Assembler, Compiler, and Interpreter) and function of each.	6.3.5	Class Lecture	
Application Software	Functionality and purpose of application software	6.4	Class Lecture	

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
B. Operating System		**Chapter-7**		
Introduction	Explain the need of operating system in the computer system	7.1	Class Lecture	1
Objectives of Operating System	Main key Objectives of Operating System	7.2	Class Lecture	
Types of OS	Single user and single task, single user and multitasking, multiuser, multiprocessing, real time, embedded OS	7.3	Class Lecture	
Functions of OS	Process management, memory management, file management, device management, protection and security, user interface	7.4	Class Lecture	
Process Management	○ Process—Process states (new, ready, running, waiting, terminated) ○ CPU scheduling—Scheduler, scheduling algorithms (FCFS, SJF, RR) ○ Process synchronization—Concurrent processes, race condition ○ Deadlock—Deadlock conditions, deadlock prevention, deadlock avoidance	7.5	Class Lecture	1
Memory Management	○ Memory allocation—Multiple partition allocation, paging ○ Virtual memory—Demand paging	7.6	Class Lecture	1
File Management,	Files, directory structure	7.7	Class Lecture	1
Device Management	Device drivers, I/O scheduling, buffering, spooling	7.8	Class Lecture	
Protection and Security	Protection mechanism of programs, processes, users and to the resources.	7.9	Class Lecture	
User Interface	CLI, GUI	7.10	Class Lecture	1
Examples of Operating Systems	MS-DOS, Windows family of OS, Linux	7.11	Class Lecture	
Software Licensing	Licensing policy concept of software.		Class Lecture	
Open-Source Software	Definition and benefits of using Open-Source software		Class Lecture	
Case study: Unix Vs Windows	Difference between Unix and Windows operating system in various aspects.		Case study	
Unit-4: Data Representation		**Chapter-5**		**5 Hrs**.
Introduction	What are various kinds of data stored in computer (Numeric, Alphabetic, Alphanumeric, symbol. Different number systems (Decimal number system, Binary number system, Octal number system, and Hexadecimal number system.	5.1	Class Lecture	1
Number System	Representation of various number systems.	5.2	Class Lecture	

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Conversion from Decimal to Binary, Octal, Hexadecimal	Method used for Conversion from Decimal to Binary, Octal, Hexadecimal	5.3	Class Lecture	1
Conversion of Binary, Octal, Hexadecimal to Decimal	Method used for Conversion of Binary, Octal, Hexadecimal to Decimal	5.4	Class Lecture	
Conversion of Binary to Octal, Hexadecimal	Method used for Conversion of Binary to Octal, Hexadecimal	5.5	Class Lecture	1
Conversion of Octal, Hexadecimal to Binary	Method used for Conversion of Octal, Hexadecimal to Binary	5.6	Class Lecture	
Binary Arithmetic	Binary arithmetic operations—addition, subtraction of signed and unsigned numbers.	5.7	Class Lecture	2
Unit-05: Computer Networks and Internet Services		**Chapter-9**		10 Hrs.
A. Computer Network				5 Hrs
Introduction	Brief background about data communication and the computer networks and their importance.	9.1	Class Lecture	1
Importance of Networking	Resource sharing, information sharing, as a communication medium, back-up and support	9.2	Class Lecture	
Data Transmission Media (Twisted pair, coaxial cable, Optical fiber, RF transmission, microwave transmission, satellite transmission)	Twisted pair, coaxial cable, optical fiber, RF transmission, microwave transmission, satellite transmission	9.3	Class Lecture	

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Data Transmission across Media	○ Transmission modes—Simplex, halfduplex, full-duplex ○ Transmission speed—Bandwidth, throughput, attenuation, distortion ○ Fundamentals of transmission—Electromagnetic waves, signals ▪ Analog and digital signals ▪ Modulation and demodulation—Amplitude, frequency, phase shift □ ▪ Multiplexing—FDM, WDM ▪ Asynchronous and synchronous transmission	9.4	Class Lecture	1
Data Transmission and Data Networking	Switching - Circuit switching, message switching, packet switching	9.5	Class Lecture	
Network Types	○ Network types—LAN, MAN, WAN	9.6.1	Class Lecture	1
Network Topology	○ Network topologies—Bus, ring, star	9.6.2	Class Lecture	
Communication Protocol	○ Communication protocol—The seven layers of OSI model	9.6.3	Class Lecture	1
Network Devices	○ Network devices—NIC, repeater, bridge, hub, switch, router, gateway	9.6.4	Class Lecture	1
Wireless Networking	Bluetooth technology, wireless LAN, wireless WAN	9.7	Class Lecture	
B. Internet				5 hrs.
History of Internet	TCP/IP, Internet applications, WWW, browser	10.2	Class Lecture	1
Internetworking Protocol	TCP/IP	10.3	Class Lecture	
The Internet Architecture	Client, local ISP, regional ISP, backbone	10.4	Class Lecture	1
Managing the Internet	ISOC, IAB, IETF, IESG, IRTF, IANA, InterNIC, W3C	10.5	Class Lecture	
Internet Connections	Dial-up access, leased line, ISDN, DSL, cable modem	10.7	Class Lecture	1
Internet Address; WWW, Domain Name System	WWW, Domain Name System	10.8	Class Lecture	

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Internet Services; E-mail and its working principle; E-commerce and E-governance,	○ WWW—Web browser, URL, Internet search engines, WWW development languages ○ Electronic mail—E-mail address, e-mail message format, e-mail services (application ○ based e-mail, webmail), how email works (client-server model) ○ File transfer protocol—How FTP works (client-server model) ○ Terminal network ○ News ○ Internet relay chat	10.9	Class Lecture	1
Web2.0	What is Web? Explain web2.0 Ver		Class Lecture	1
Internet of Things (IoT)	What is Internet of Things (IoT)?		Class Lecture	
Wearable computing	What is Wearable computing?		Class Lecture	
Cloud computing	Cloud computing and it's importance		Class Lecture	
Smart City	Smart cities vs ICT and it's importance		Class Lecture	
Case Study: ISP in Nepal and their services	Case Study: ISP in Nepal and their services		Case Study and presentation	
Unit-06: Database System				5 Hrs.
Introduction	What is Database, DBMS and RDBMS?			1
Database	○ File-oriented approach and database approach ○ Characteristics of database approach ○ Data models, schemas and instances ○ Conceptual data model—Entity, attribute, relationship, and E-R model ○ Representation data model—Hierarchical, network, relational data model ○ Low level, or physical data mode	12.2	Class Lecture	
Database System	○ Components of database system— Users, software, hardware, and data ○ Architecture of database system—Internal level, conceptual level, and external level	12.3	Class Lecture	1
Database Management System	○ Data independence—Logical data independence, physical data independence ○ Data dictionary, Database Administrator (DBA) ○ Database languages—DDL, and DML		Class Lecture	
Database System Architectures	○ Centralized DBMS architecture, client-server architecture, and distributed database	12.5	Class Lecture	1
Database Applications	Different purposes like (1) personal databases; (2) workgroup databases (3) departmental databases and (4) enterprise databases		Class Lecture	1

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Introduction to Data Warehousing	Concept of Data Warehouse		Class Lecture	1
Data mining	Concept of Data mining		Class Lecture	
BigData	Concept of BigData		Class Lecture	
Unit-07: Computer Security			Class Lecture	4 Hrs.
Introduction (Security attacks, security mechanisms, security services	Background about why we require Computer security with different types of security attacks, mechanism available and various services provided by a system.	14.1	Class Lecture	1
Security Threat and Security Attack	Difference between Security Threat and Security Attack. Types of security attack.	14.2	Class Lecture	
Malicious Software	Virus, worm, trojan horse, JavaScript, java applet, ActiveX control	14.3	Class Lecture	1
Security Services	Confidentiality, integrity, authentication, non-repudiation	14.5	Class Lecture	
Security Mechanisms (Cryptography, Digital Signature, Firewall, Users Authentication, Intrusion Detection Systems)	○ Cryptography—Secret key cryptography, public-key cryptography, hash function ○ Digital signature—Digital signature algorithms ○ Firewall—Functions of firewall, working principle, types of firewall (packet filter firewall, ○ circuit filter firewall, proxy or application-level firewall) ○ Users' identification and authentication—User name and password, smart card, ○ biometrics ○ Other security measures—Intrusion detection systems, virus protection software, data ○ and information backups, SSL, IPsec protocol	14.6	Class Lecture	1
Security Awareness	Security awareness to enhance the security of the organization's resources by improving the awareness of the need to secure the system resources.	14.12	Class Lecture	1
Security Policy	Formulating a security policy	14.13	Class Lecture	
Unit-08: Application and Impact of IT				3 Hrs.
Application of IT	Describe what is IT and explain various areas where IT can use.		Case Study and Presentation	2

Contents from syllabus	Description of content of the sub-unit (depth)	Text book reference	Methodology	Hours
Impact of IT on organization and individuals	Explain how technology and information systems are essential to maintaining, supporting, and enriching many aspects of the lives of individuals, operations of organizations. Explain both Positive and negative impact.		Case Study and Presentation	
Societal impacts of IT	Explain society and how technology and information systems influencing many aspects of societies.		Case Study and Presentation	
IT Strategic Planning	Explain the concept of organization Strategic Planning and IT strategic planning to meet organization strategic objectives and business goals.		Class Lecture	1
IT and Business Alignment	Explain how IT Operational or tactical (getting technology in place) align with the business objectives and to drive business results.		Class Lecture	

Text Books:

1. Computer Fundamentals, Anita Goel, Pearson Education India

Reference Books:

1. Introduction to Computers, Peter Norton, 7th Edition, McGraw Hill Education
2. Fundamentals of Information Technology, Leon and Leon
3. Computer Fundamental, Pradeep K. Sinha and Priti Sinha
4. Introduction to Information Technology, E. Turban
5. Information Technology for Management, E.Turban, C. Pollard, G. Wood, Wiley Publication
6. Information Technology for Management, Henry C. Lucas, Jr.

Laboratory Works: The laboratory work includes

1. Practical knowledge of Hardware components of computer
2. Operating systems (DOS and Windows Operating System)
3. Word Processors
4. Spreadsheets
5. Presentation Graphics
6. Database Management Systems, and
7. Internet and its services.

Objectives of Lab work: Students should be able and capable to know basic components of computer system and capable to use application Packages in their personal and professional life.

Practical knowledge of Hardware components of computer:
Explain the different components housed within desktop cabinet, various types of Expansion slots and I/O ports in Desktop computer.

Operating systems (DOS and Windows Operating System):
Function of following internal and external DOS commands and their syntax. Run and test each command in Lab.

- Basic DOS Commands:
  - **CLS**
  - **TIME**
  - **DATE**
  - **SET PROMPT**
  - **HELP**
- Use of Wildcard characters.
- Directory Manipulation:
  - **MD or MKDIR**
  - **CD or CHDIR**
  - **TREE**
  - **RD or RMDIR**
- File Manipulation:
  - **DIR**
  - **Wildcard characters**
  - **COPY**
  - **XCOPY**
  - **DEL or ERASE**
  - **UNDELETE**
  - **DOSKEY**
  - **RENAME or REN**
  - **TYPE**
  - **PRINT**
  - **COPY CON**
  - **Notepad**
  - **write**
  - **ATTRIB**
  - **PATH**
- Use of Redirection, Filters, Pipes:
  - **Redirection input and output (<, >, >>)**
  - **Filters (more, sort)**
  - **Pipe (|)**

Windows Operation System:
Different windows versions; Windows Desktop Components (start Menu, Search Box, Task View, Pinned Apps, Task Tray, Notification Tray & Clock, Action Center, Desktop Icons and Desktop); Personalize Desktop Background; add icons in desktop; Max. Min, Close buttons of windows; Start Menu, Virtual Desktops; Navigate File and Folders of computer using Search box; File Explorer to manage files and folders; Recycle Bin; Windows Security (user Account Control, Windows Defender, Firewall); Using help for Interactive Learning; Using Windows Accessories(Character Map, Paint, Notepad, Snipping Tool, WordPad etc.); Disk Cleanup; Disk Defragmenter; Windows Apps management

MS Word:
Microsoft office Screen elements (File tab, Ribbon tabs, Groups and Dialog box launcher, Quick access toolbar, sizing button); Creating and Saving Document; Copy, Cut and Paste, Format painter, Undo & redo;

Print Preview, Printing Document; Manipulating and formatting Text, Paragraph formatting; Boarder and shading; Tabs; Styles; Page formatting; Tables; Inserting pictures, Shapes, SmartArt; Finding and Replacing text; Multiple open documents (switching between open documents; Tiling or cascading documents; Comparing documents side by side); Mail Merge; Headers, Footers and Sections; Watermarks; Manipulating styles; Text wrapping and Pictures; Using columns; footnotes and endnotes; bookmarks and cross-reference, hyperlinks; Micros; tracking and comments; Table of contents and indexes; Table of figures.

MS Excel:
MS Excel Screen Elements(Row numbers, Column letters, cell reference, Name Box, Active cell, Formula bar, Work area, Sheet tabs); difference between Workbook, Worksheet, Spreadsheet; Opening new worksheet; previewing and printing a worksheet; cell and cell range; different types of cell content, cell formatting, formula and functions; Copy and paste cell content, using paste special; drag and drop cell; fill handle; Find and replace; sorting; Filter; Freeze panel; Formatting/conditional formatting; protecting file and worksheet with passwords; Working with charts; Data validation, consolidating; Using What-if Analysis; Pivot Tables; Hlookup; Vlookup.

Presentation Graphics:
Creating presentation slides; Adding animations; Inserting Charts, Graphics, Movies and Sound Clips.

Database Management Systems:
Creating tables, query, reports, and forms; Understanding different data types.

Internet and its services:
Understanding Internet and its services like WWW and E-mail; Using search engine;
Managing web browsers