GAINS
GANDAKI ACADEMY
OF INTERDISCIPLINARY STUDIES
EMPOWERING FUTURES

BSc-CSIT
FAR WESTERN UNIVERSITY

Course Title:	**Information Technology Fundamentals**	**Credit:**	**3**
Course Code:	**CSIT 112**	**Number of periods per week:**	**3**
Nature of Course:	**Theory + Lab**	**Total Hours:**	**48**
Year:	**First**	**Semester:**	**1**

1. **Course Introduction**
   The course aims to acquaint the students with the basic concepts of Fundamental concept of Information technology, Computer systems, computer hardware and Software, input, output and storage devices, Binary system, programming languages, Data files and DBMS, fundamental concept of telecommunication, networking and internet and application of computer systems.
2. **Objectives**
   This course introduces fundamental concepts of Information Technology and Computer Systems.
3. **Specific Objectives and Contents**

Unit 1: Computer Concepts (4 hrs)	
Specific Objectives • What is data and information? • Describe processing cycle. • Describe what is hardware and • software. • Understand the evolution of computers, from refining of abacus to supercomputers. • Understand the advancement in technology that has changed the way computers operate, efficient, size, and cost. • Classify different computers, networks, software • Understand computer programming languages • Classify different programming languages • Understand the purpose of programming languages, facilities and various common examples.	**Contents** Ideas of Information, Information Processing and Data. The Data Processing Cycle. Examples of computer applications. Definition of Hardware; broad classes of computers (mainframe, mini and microcomputers) and networks. Computer programs. The computer as a programmable device. Classes of software (system and application). Programming languages: purpose, facilities and common examples.
Unit 2: Computer Hardware (4 hrs)	
Specific Objectives • Understand the basic units of computer system (Anatomy of a Digital Computer) • Understand how the basic digital computer is organized • Describe the purpose of basic units of computer systems.	**Contents** The Central Processing Unit (Control Unit, Arithmetic and Logic Unit, Main Memory). Peripherals. The organization of a simple computer. The storage of programs and data. Data and Control paths in the computer (buses or highways). The Fetch-execute Cycle.
Unit 3: Data (2 hrs)	
Specific Objectives • Learn about the digital symbols, base. • Understand with the coding schemes for the internal storage of characters. • Understand what are on-line and offline peripherals and data. • Understand what is verification and validation of data.	**Contents** Representation and Input: The Stages (collection, preparation, verification, input methods). Input Devices and Media. On-line and Off-line peripherals. Verification and Validation methods.

Unit 4: Input Devices (2 hrs)

Specific Objectives	Contents
• Familiarize with the various types of input devices along with their advantages, disadvantages, and applications	Description of common input devices and media (such as keyboards, light pens, mice, magnetic stripe readers, punched media, magnetic and optical character recognition, mark readers...), including simple physical principles of operation and practical applications.

Unit 5: Output Methods, Devices and Media (2 hrs)

Specific Objectives	Contents
• Familiarize with the various types of output devices to get desired result that may be in various from viz text, graphics, audio, and video; along with their advantages, disadvantages, and applications.	Description of Displays, Printers, Plotters and Computer Output on Microfilm, including simple physical principles of operation and applications.

Unit 6: Computer Storage (4 hrs)

Specific Objectives	Content
• Understand the purpose of memory. • Familiarize with the different category of memories, units of storage, access time. • Discuss various types of primary and secondary memories with their storage organization	Levels of storage: register, main and backing store. Units of storage (bytes and words) and capacities (Kbytes, Mbytes, Gbytes and TBytes). Definition of Access Time. Principles of construction of magnetic tape drives, magnetic disc drives (floppy and hard drives), CD-ROM and DVD; recordable and rewritable compact discs: CD-R and CD-RW.

Unit 7: The Binary System (5 hrs)

Specific Objectives	Content
• Learn about the binary number system and its advantages. • Representation of various number systems, methods of number system conversions. • Specify the rules to perform four principle arithmetic operations addition, subtraction, multiplication, division of binary numbers with the help of suitable examples • Define two types of real numbers viz. fixed point representation, floating point representation; within floating point (non-normalized and normalized) and their representations in computer memory • Understand truth table and half-adder and full-adder operations	Reasons for employing binary in a computer. The advantages and disadvantages of binary. The binary representation of numbers, characters and program instructions. Octal and Hexadecimal forms. Conversion between decimal, binary, octal and hexadecimal integers. Binary addition. Arithmetic overflow. Boolean logic. Simple AND, OR and NOT functions in two and three variables. Truth Tables. Half-adder and Full adder logic. Logic diagrams.

Unit 8: Programming Languages (7 hrs)

Specific Objectives	Content
• Discuss the prominent concepts to natural languages and computer languages. • Acquaints with the different generations of programming languages with their advantages and disadvantages • Elaborates the stages required during translation process (HLL, Assembly language to machine code) • Understand the concept of visual programming language and platform independent.	Ideas of generations of programming languages: fourth generation (4GL), third generation ('high level'), assembly and binary machine code. Suitable applications for each level; comparisons between the levels. Translator programs - compilers, interpreters and assemblers; source code and object code. The concept of 'visual' languages. Java and the platform independence of its programs. The concept of operating system, functions of operating system, component of operating

• Outlook on the basic role of operating system in modern day computers • Learn about the different types of operating systems • Provide an overview of UNIX/LINUX operating system.	system, types of operating system. An overview of UNIX operating system.
Unit 9: Data Files (4 hrs)	
Specific Objectives • Understand the concept behind database, file, record, field and character • Understand different types of data files and access methods.	**Content** Definitions of file, record, field and character. The concepts of file organization file access and file processing (updating). The main types of data file such as master and transaction. Serial, sequential and indexed sequential organization. Direct access and serial access. Updating sequential (tape or disc) files and indexed sequential files. Concepts of a simple database.
Unit 10: Simple Telecommunications (4 hrs)	
Specific Objectives • Explain the computer related terms, communication networks, and flow of information through different forms of channel • Understand the concept of serial and parallel transmission, different transmission modes.	**Content** Serial and Parallel transmission compared. Simplex, Half-duplex and Duplex modes. Modems and Multiplexors. Simple Interfaces. Character Codes. Basic communications facilities and the concept of bandwidth.
Unit 11: Common Applications of Computer Systems (4 hrs)	
Specific Objectives • Understand the various applications of computer systems in different organizations in terms of purpose, hardware, data, processes, outputs, advantages and limitations.	**Content** Non-technical descriptions (purpose, hardware, data, processes, outputs, advantages and limitations) in banking, education, engineering, police, hospitals, credit reference, meteorology, airline reservation and stock control.
Unit 12: Networking and The Internet (6 hrs)	
Specific Objectives • Describe computer networks and its various types • Discuss various computer network topologies. • Understand the concept of WWW, Internet in terms of their uses, advantages and disadvantages. • Learn about the different browsers and its uses. • Learn various internet application viz email, FTP. • Understand fundamental concepts of HTTP and its uses.	**Content** Concepts of Local Area Networks, Wide Area Networks and the Internet. Computer network topologies. The World Wide Web: the concept, its uses and possible disadvantages. Internet Service Providers. Web pages: construction and access; the role of Hypertext Markup Language (HTML) and Java. The concept of electronic mail and its basic uses. The basic functions of browsers.

4. Evaluation System

Undergraduate Program				
External Evaluation	**Marks**	**Internal Evaluation**	**Weightage**	**Marks**
Semester End Examination	60	Assignments	10%	40
		Quizzes	10%	
		Attendance	10%	
		Presentation	10%	
		Term Papers	10%	
		Mid-Term Examination	40%	
		Group Work	10%	
Total External	60	Total Internal	100%	40
Full Mark: 60 + 40				100

5. External Evaluation

End semester examination: It is a written examination at the end of the semester. The questions will be asked covering all the units of the course. The question model, full marks, time and others will be as per the following grid.

Nature of Question	**Total Questions to be asked**	**Total Questions to be Answered**	**Total Marks**	**Weight**
Group A: Very short answer questions	8	8	8 X 3 = 24	24%
Group B: Short answer type questions	6	5	5 X 8 = 40	40%
Group C: Long answer type questions/case studies	4	3	3 X 12 = 36	36%
			100	**100%**

Each student must secure at least 50% marks in internal evaluation in order to appear in the end semester examination. Failing to get such score will be given NOT QUALIFIED (NQ) and the student will not be eligible to appear in the end semester examinations.

Practical examination: Practical examination will be taken at the end of the semester. Students must demonstrate the knowledge of the subject matter.

Internal evaluation:

Assignment:
Each student must submit the assignment individually. The stipulated time for submission of the assignment will be seriously taken.

Quizzes:
Unannounced and announced quizzes/tests will be taken by the respective subject teachers. Such quizzes/tests will be conducted twice per semester. The students will be evaluated accordingly.

Attendance in class:

Students should regularly attend and participate in class discussion. Eighty percent class attendance is mandatory for the students to enable them to appear in the end semester examination. Below 80% attendance in the class will signify NOT QUALIFIED (NQ) to attend the end semester examination.

Presentation:
Students will be divided into groups and each group will be provided with a topic for presentation. It will be evaluated individually as well as group-wise. Individual students have to make presentations on the given topics.

Term paper:
Term paper must be prepared by using computer in a standard format of technical writing and must contain the required number of pages. It should be prepared and submitted individually. The stipulated time for submission of the paper will be seriously taken as one of the major criteria of the evaluation.

Mid-term examination:
It is a written examination and the questions will be asked covering all the topics in the session of the course.

Discussion and participation:
Students will be evaluated on the basis of their active participation in the classroom discussions.

Instructional Techniques:
All topics are discussed with emphasis on real-world application. List of instructional techniques is as follows:

- Lecture and Discussion
- Group work and Individual work
- Self-study
- Assignments
- Presentation by Students
- Term Paper writing

Quizzes

Guest Lecture
Students are advised to attend all the classes and complete all the assignments within the specified time period. If a student does not attend the class(es), it is his/her sole responsibility to cover the topic(s) taught during that period. If a student fails to attend a formal exam/quiz/test, there won't be any provision for re-exam. Unless and until the student clears one semester he/she will not be allowed to study in the following semesters.

Prescribed Text

- *Longmans , Glossary of Computing Terms, British Computer Society, ISBN 0582-36967-3 or ISBN 0582 47594-5*
- *C S French , Computer Science, Fifth edition; Continuum; ISBN 0-8264-5460-7*
- *Geoffrey Knott and Nick Waites, Computing, Third edition; Business Education Publishers; ISBN 1901-888215*
- *Capron and Johnson, Computers: Tools for an Information Age, Eighth edition; Prentice Hall; ISBN 0-13-122723-8*
- *Ray Bradley; Stanley Thornes, Understanding Computer Science, ISBN 0-7487-4046-5*
- *Alexis Leon, Mathews Leon, Fundamentals of Information Technology, Leon TechWorld*
- *V. Rajaraman , Fundamentals of Comp*

Lab Work

This is the first and introductory course in CSIT and the main objective in lab work in this course is to familiarize students with different operating systems software, use it and operate it. Develop skills to use various desktop applications required for doing day-to-day activities like Microsoft Office Software packages. Course instructor can assign various practical assignments related to the course covered during the theory classes. No specific lab work is required for this course.