**Scheme of Work**

**Form 4 Term 1**

**FUNDAMENTALS OF HARDWARE AND SOFTWARE**

| **DURATION SPECIFIC OBJECTIVES**  **(WK)** | **CONTENT** |
| --- | --- |
|  | |
| *1 WEEK*  describe a *general-purpose* computer system; | Major functions of systems: input, processing, output, storage. |
| *explain* the functions of the major hardware  *2*  *WEEKS*  components of a computer system; | Central Processing Unit (CPU): control unit and ALU; main memory/immediate access storage, secondary storage, input/output devices. |
| *outline* the functions and uses of primarystorage devices; | Bistable devices, PROM, EPROM, RAM, ROM. |
| *manipulate units of storage;* | *Bit, byte, kilobyte, megabyte, gigabyte, terabyte, word, word size.* |
| *compare the types of secondary storage media with respect to portability, speed and capacity;*  *3*  *WEEKS* | *Magnetic tape, floppy disk, hard disk (fixed head, moving head, external), optical disks (CD, DVD), flash drive, flash memory cards.* |
| use terms associated with storage devices; | Read/write head, sectors, tracks, buffers, cylinders, access time, sequential access, direct access; *device interfaces such as: SCSI, IDE, SATA.* |
| *explain the uses of various input devices and media;*  *3 WEEKS* | Optical mark reader (OMR), character readers (OCR, MICR), mouse, joystick, *bar code reader, document scanner*, light-pen, touch terminals, voice response unit, pads and tablets, point of sale (POS), keyboard, *digital camera, biometric systems, sensors, remote control, sound capture, pointing devices, webcam.* |

**FUNDAMENTALS OF HARDWARE AND SOFTWARE (cont’d)**

|  |  |
| --- | --- |
| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| (**WK)** | |
| *state the types and functions of output devices;*  *2 WEEKS* | *Visual display unit: resolution, types, sizes. Printers: impact and non-impact, types: (character, line, page, laser, inkjet, dot matrix).Characteristics: (speed, quality, storage capacity); plotters; audio output devices (for example, speakers, head-phones, earphones); microfilm. Also terms such as hard copy, soft copy, human readable and machine–readable.* |
| describe how data are stored and manipulated within the computer;  *2*  *WEEKS* | Binary, octal and hexadecimal number systems; binary addition *and subtraction.* Integers (positive and negative): sign and magnitude, BCD, two’s complement; representation of characters, *ASCII.* |

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| *interpret the hardware specifications of a computer system;* | *CPU type and speed; memory: capacity, type, word size, speed. Hard drive: capacity, speed; fire wire, expansion slots, ports.* |

**Scheme of Work**

**Form 4 Term 2**

|  |  |
| --- | --- |
| distinguish between systems programs and application programs;  *1 WEEK* | *Systems software: operating systems, translators, utilities: Application software: general purpose, special purpose, custom written. Customization, integrated software.* |
| *explain the functions of an operating system;*  2  *WEEKS* | *File management, memory management, security, device management, input/output management, user interface, process management.* |
| *Distinguish among multitasking, multiprocessing and multiprogramming;* | *Basic treatment of these terms. (See glossary).* |
| *explain the different types of processing modes;* | *Batch processing, real-time, on-line, time-sharing.* |
| Distinguish between types of user interface. | *Software interface: Command driven, graphical user interface (GUI) (menu driven, pull-down and pop-up menus, icons). Hardware interface: touch screens, non-visual interface, sensors, and Braille keyboards.* |

**INTERNET AND COMMUNICATIONS TECHNOLOGY**

|  |  |
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| **DURATION SPECIFIC OBJECTIVES**  **(wk)** | **CONTENT** |
|  | |
| 1  WEEK |  |
| 1. *distinguish among Internet*, intranet *and extranet*; | *Refer to glossary.* |
| 1. *explain concepts associated with the Internet;*   1  WEEK | *Including Electronic mail (e-mail), newsgroups, Internet Relay Chat (IRC), Telnet, File Transfer Protocol (FTP), upload, download, World Wide Web (WWW), web browser, HTTP, Hypertext Markup Language (HTML/XHTML), web page, website, blogging, webserver, URL, e-commerce, e-learning, HTTP, pod-casting, bulletin board, VoIP.* |
| 1. describe measures to secure data and maintain data integrity; | *Software Restrictions: passwords, encryption, virus protection, firewall; physical access restrictions: biometric systems, guards, locks; fire/water proof cabinets; archiving; backup and recovery procedures; propriety data and software.* |

**Scheme of Work**

**Form 4 Term 2 (continued)**

**APPLICATIONS AND IMPLICATIONS *OF INFORMATION AND COMMUNICATIONS TECHNOLOGY* (cont’d)**

|  |  |
| --- | --- |
| **SPECIFIC OBJECTIVES** | **CONTENT** |
| 1  WEEK | |
| 1. *outline ways by which* information can be misused; | *Violation of privacy, propaganda, software piracy, computer fraud, electronic eavesdropping, industrial espionage, surveillance, storage of inaccurate information, identity theft, credit card fraud.* |
| 1. describe appropriate hardware and software to meet the particular needs of a given application;   1  WEEK | *Projects to determine the relevant hardware and software (open source vs. proprietary) used in areas including business, industry, science and technology, education, law enforcement, recreation, music, gaming.* |
| 1. *Describe current and emerging* technological trends; | *Expert systems, robots, CADD, CAE, CAM, telemarketing, teleconferencing.* |
| 1. *assess* the impact of Information Technology on job skills and careers;   1  WEEK | Computer skills used by office employees, teachers, engineers, medical personnel, musicians, mass media personnel, law enforcement personnel, movie industry; loss of jobs; retraining; telecommuting. |
| 1. *Describe* the roles of various personnel in computer-related professions. | *The functions of individuals in computer-related fields: programmers, systems analysts and designers, IT managers, systems programmers, database administrators, network administrators, IT managers, file librarians, computer technicians, computer engineers, software engineers, software testers, webmaster, web-developer, software trainer, multi-media artists.* |

**Scheme of Work**

**Form 4 Term 2 (continued)**

**SECTION 5: INFORMATION PROCESSING**

|  |  |
| --- | --- |
| **SPECIFIC OBJECTIVES** | **CONTENT** |
|  |  |
|  |  |
| 1  WEEK |  |
| 1. *distinguish between data and information;* | Data as raw unprocessed facts; information as processed data. |
|  |  |
| 1. explain the characteristics and functions of Information Processing;   1  WEEK | *Forms* of Information Processing: automation, process control, commercial, industrial, and scientific data processing; information retrieval and management. |
| 1. identify the sources of data in specified application areas; | Source document, turnaround document, machine and human readable document. |
|  |  |
| 1. describe methods of validation and verification of data; | Difference between validation and verification. Methods: range check, reasonableness checks, data type checks, inconsistency checks*.* |
| 2  WEEKS |  |
| 1. identify appropriate verification and validation checks given a particular scenario; | *Such as* double entry to identify and correct typographical/transposition errors. |
|  |  |
| 1. describe various methods of file organization and access; | Sequential field ordering; random, index-sequential; *direct-access, sequential-access.* |
| 1. select appropriate file organization for particular application. | *Associate an appropriate file structure and access method to a specific application. For example, a payroll file would be organized sequentially with sequential access.* |

**Scheme of Work**

**Form 4 Term 3**

***PROBLEM-SOLVING AND PROGRAM DESIGN***

**GENERAL OBJECTIVE**

On completion of this Section, students should have an understanding of the fundamental principles and practices of p*roblem-solving on the computer*.

|  |  |
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| **DURATIONSPECIFIC OBJECTIVES**  **(WK)** | **CONTENT** |
|  | |
| *outline the steps in problem-solving;*  *1 WEEK* | *Definition ofthe problem; propose and evaluate solutions; determination of the most efficient solution; develop and represent algorithm; test and validate the solution.* |
| *decompose* a simple problem into its *significant* parts;  *1 WEEK* | The components are: input; process; storage; output. |
| *distinguish between variables and constants;* | *Variables as an area of storage whose value can change during processing; the value of a constant never changes.* |
| *use appropriate data types;* | *Integers, floating point (real), characters, literals.* |
|  |  |
| *explain the concept of algorithms;*  *2 WEEKS* | *Definition of algorithms; Characteristics: finite number of steps, precise, unambiguous, flow of control from one process to another, terminate.* |
|  |  |
| *identify ways of representing algorithms;*  *2 WEEKS* | *Representation of algorithms as Pseudocode or Flowcharts; Use of flowchart symbols: input/output, process, decision, directional arrows.* Pseudocode - Use of: Read, Input, Store Write, Output, Display, If-then; If-then-else; For loop; while loop; (*questions which require nested conditionals or nested loops will not be asked*).  Truth Tables  Use of relational operators: <, >, =, <=, > =, <>. Logical operators: AND, OR, NOT.  Arithmetic operators: *+‚ –‚ \*, /*.  *Simple problems including; average, maximum.* |
|  |  |
| *develop algorithms to solve simple problems;* | *Use ofproblem-solving techniques outlined in Specific Objective 1 to the solution of simple problems.* |

**PROBLEM-SOLVING AND PROGRAM DESIGN (cont’d)**

|  |  |
| --- | --- |
| **SPECIFIC OBJECTIVES** | **CONTENT** |
|  |  |
| *1 WEEK* |  |
|  |  |
| test algorithms for correctness;  *1 WEEK* | *Construction and use of trace tables to determine result. Trace table consists of variable names (identifiers) as column headings and values in the cells, one row for each pass.* |
| *use the top-down design approach to problem solving.* | *Application of stepwise refinement to problems with two or more tasks.* |

**Scheme of Work**

**Form 4 Term 3 (Continued)**

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| **SPECIFIC OBJECTIVES** | **CONTENT** |
|  |  |
| Students should be able to: | |
| *1 WEEK* |  |
| 1. *distinguish between low-level and high-level programming languages*; | *Low-level language (Machine or Assembly Language); High-level language (Pascal, C).* |
|  |  |
| 1. *distinguish among the different generations of programming languages;* | *Characterization of first through to fifth generation languages.* |
|  |  |
| 1. *list the sequence of steps associated with implementing a program;* | *Create source* code, compile, *linking, executing, maintain program.* |
| *1 WEEK* |  |
| 1. *explain commonly used terms and concepts in programming;* | *Testing, debugging, syntax errors, logic errors, run-time errors, dry run, test data.* |
|  |  |
| 1. *declare* elementary data types; | *Integers, real numbers, characters.* |
|  |  |
| 1. *declare variables and constants;*   *1 WEEK* | *Use of meaningful variable names and constants; assign initial values.* |
|  |  |
| 1. *manipulate data;* | *Reading from and writing to variables, arithmetic operations.* |
| 1. *use control structures*; | *Conditional branching: if-then, if-then-else, Loops: while, repeat, for.* |
|  |  |
| 1. *manipulate data in a list;*   *1 WEEK* | *Declare 1-dimensional arrays; reading from and writing to arrays; traversing arrays; linear search.* |
| 1. perform checks and tests on programs to verify correctness; | Testing and debugging techniques. |
|  |  |
| 1. Write documented programs. | Importance of documentation; *features of* internal documentation (use of mnemonic names, use of comments, indentation, effective use of white spaces); external documentation (user manuals). |
|  |  |

**Scheme of Work**

**Form 5 Term 1**

***WORDPROCESSING***

**GENERAL OBJECTIVE**

|  |  |
| --- | --- |
| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| **(WK)** |  |
|  |  |
|  |  |
| *select appropriate editing features in the preparation of a document;*  2  WEEKS | *Deleting and inserting characters, words, lines, sentences, paragraphs. Type-over mode. Selecting blocks of text. Copying and moving sections of text.* |
|  |  |
| *describe* commonly available features; | *Page numbers, page breaks, text alignment, wordwrap, margins, tabs, page length, default settings, font size.* |
|  |  |
| *select appropriate formatting features for the preparation of a document;* | Margins, tab stops, line spacing, page breaks, page numbers, left and right justification, centre line, *underline, highlight, uppercase, bold, and italic.* |
|  |  |
| *use* headers, footers, footnotes and endnotes *appropriately;* |  |
|  |  |
| *combine documents;*  3  WEEKS |  |
|  |  |
| *perform block operations;* |  |
|  |  |
| *use* columns and tables *appropriately*; |  |
|  |  |
| *apply appropriate character formatting features;* | Underline, bold, italics, font types and sizes, superscript and subscript. |
|  |  |
| *use search and replace functions appropriately;* |  |
|  |  |
| 1  WEEK  *use mail-merge facilities;* | *Creation of primary documents and data files in mail merge application; Field names.* |
|  |  |
| *use spell-check;* |  |
|  |  |
| *import documents;* | *Text files, graphics, tables including options such as automatic save and backup copy, password protection, track changes.* |
|  |  |

***WORDPROCESSING &PRESENTATION*  (cont’d)**

***B: PRESENTATION***

|  |  |
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| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| **(WK)** | |
|  |  |
| *explain the uses of presentation software;*  1  WEEK | *For example, to enhance public speaking; to deliver lectures; to present project reports; to effectively present sales or marketing ideas.* |
|  |  |
| *explain the concepts of wizards, templates and slides;* |  |
|  |  |
| *choose appropriate slide layout;*  2  WEEKS | *Slide layout must relate to the type of information being presented.* |
|  |  |
| *apply design templates to slides;* | *Choosing from a list of presentation designs.* |
|  |  |
| *use formatting features effectively to enhance presentation;* | *Changing background colour, font size and other attributes, such as font colour and bullets.* |
|  |  |
| *create slide headers and footers;*  2  WEEKS  *create and use speaker notes;* | *Use of the slide master to personalize the slides.* |
|  |  |
| *apply various types of animation effects to slides;* | *Flying, drive-in, camera effects; flash-once, typewriter; laser, reverse-texts, drop-in effects. Custom animation; timing and sound effects.* |
|  |  |
| *insert graphics and moving pictures into a slide;*  3  WEEKS |  |
|  |  |
| *manipulate multiple slides;* | *Insertion and deletionof slides; use of the slide sorter.* |
|  |  |
| *presenta slide show.* | *Use of slide show tools such as slide navigator, pointer options, screen attributes.* |

***WEB PAGE DESIGN***

**Form 5 Term 2**

|  |  |
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| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| **(WK)** | |
|  |  |
|  |  |
| 2  WEEKS |  |
| 1. *create a simple web page;* | *Choosing an appropriate design for a page; inserting and deleting text and graphics; wrap text with image; create thumbnail image, index page, home page, hyperlink.* |
|  |  |
| 1. *create hyperlinks;* | *Linking to another web page; link to a location within the web page; link to an email address; link to user-created files.* |
| 2  WEEKS |  |
| 1. *test the website;* | *Use of a web browser; verify that all the hyperlinks work correctly; use a test audience.* |
|  |  |
| 1. *publish and maintain a website.* | *Registering domain names; locate hosting company; the use of the file transfer protocol (FTP) for uploading files.* |

***SPREADSHEETS***

|  |  |
| --- | --- |
| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| **(WK)** |  |
| 1  WEEK | |
|  |  |
| 1. *explain the purpose of a spreadsheet;*   1  WEEK | *Definition of spreadsheet: a spreadsheet is a table consisting of cells (rows, column locations) that hold accounting or financial data and simulates the traditional physical spreadsheet; it captures displays and manipulates data.* |
|  |  |
| 1. *use appropriate terminology and notions commonly associated with spreadsheets;* | *Row, column, cell, cell address, label, value, formula, function, worksheet, template, range, title, window, record.* |
| 1. *select basic pre-defined systems functions;* | *Including sum, average, date, maximum, minimum, count, if, vlookup, rank.* |
|  |  |
| 1. *create advanced arithmetic formulae;*   1  WEEK | *Formulae involving addition, subtraction; multiplication; division; powers; square roots, the use of brackets.* |
|  |  |
| 1. *explain the use of common features of spreadsheet software;* | *Row/column title locking, relative addressing, absolute addressing.* |
|  |  |
| 1. *invoke row and column title locking;*   1  WEEK | Horizontal, vertical, both. |
| 1. *replicate (copy) formulae into other cells;* | Relative versus absolute addressing. |
|  |  |
| 1. *manipulate data on a spreadsheet;* | Effects of move, copy, delete operations on formulae. |
| 1. *manipulate columns and rows;*   1  WEEK | Insert and delete columns and rows. |
|  |  |
| 1. *format a spreadsheet;* | Numeric data formatting, text formatting, alignment, borders. |
|  |  |
| 1. *sort a spreadsheet;* | Primary field, secondary field, ascending vs. descending order. |

|  |  |
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| 1  WEEK |  |
| 1. *find a record matching a given criterion;* | Simple criterion, complex criterion, record - find command. |
|  |  |
| 1. *perform charting operations;* | Bar charts, line graphs, pie charts, graph titles, labels on axes. |
|  |  |
| 1. *select appropriate graphical representation of data;* |  |
| 1  WEEK |  |
| 1. *manipulate multiple worksheets;* | *Use of two or more worksheets to solve problems involving some or all of the functions and operations listed above.* |
|  |  |
| 1. *import files.* | *Graphics, tables.* |

**DATABASE**

|  |  |
| --- | --- |
| **DURATION SPECIFIC OBJECTIVES** | **CONTENT** |
| **(WK)** |  |
|  |  |
| 1  WEEK |  |
| 1. *explain the concept of a database;* | *Definition of database: repository of information; collection of tables that are related to each other.* |
|  |  |
| 1. *use terminology commonly associated with a database;* | *Database terminology: table (relation), entity, tuple, attribute, primary key, secondary key, composite key, candidate key, alternate key, foreign key.* |
|  |  |
| 1. *distinguish among terminology associated with files and databases;* | *Row (tuple, record), column (attribute, field), key.*  *Data types: alphanumeric; numeric; data; logical.* |
| 1. *outline the advantages and limitations of databases;* | *Comparison with files with regards to: Speed; Ad hoc queries; standardization; present multiple views of the same data.* |
| 1  WEEK |  |
| 1. create a database; | Table structure with at least three data types and populate with at least twenty-five records. **Use of wizard is prohibited**. |
|  |  |
| 1. modify a table structure;   1  WEEK | *Adding new fields, deleting fields, changing field definitions.* |
| 1. sort a database; | Arranging data in numeric, alphabetic; or alphanumeric format. Report generating facilities of the database  package, including use of sorting, grouping statistical and summary features, for example, count, sum and average. |
|  |  |
| 1. establish relationships; | *Use of joins, merge tables/files.* |
|  |  |
| 1. query a database using multiple search conditions; | *Using more than one criterion; use of select, calculated fields.* |
| 1  WEEK |  |
|  |  |
|  |  |
|  |  |
| 1. determine the results of a search on a database given multiple conditions; | *Two or more* fields involving the use of relational and logical operators. |
|  |  |
| 1. *generate reports to the screen, printer and files.* | *Report generating facilities of the database package, including use of sorting, grouping, statistical and summary features, for example, count, sum and average.* |