IM SYLLABUS (2020)

INFORMATION TECHNOLOGY	**IM 19**
SYLLABUS	

Contents

Information Technology IM 19	(Available in September)
Syllabus	1 paper (3 hours) + coursework

Introduction

The aim of this subject is to prepare candidates for understanding the practical aspects of computing and become aware of the organisational environment in which it has to operate.

In particular it aims to prepare candidates to:

- Acquire a basic knowledge of computer hardware and software.
- Become familiar with the functions of Information Systems.
- Understand how computers are integrated into an organisation.
- Learn how information is managed within organisation.
- Develop basic communication and business skills required in computing.

Course Structure

Prerequisites: None.

Duration: A 2-year period of study is assumed with a total of approximately 140 contact hours, which include both lectures and lab work.

Content

The syllabus consists of three major modules:

1: Computing Principles

Aim: To show how ICT is affecting various spheres of modern society and to give a broad foundation of basic computing/data processing knowledge and skills. Candidates are expected to become familiar with the various types of software categories and their capabilities.

2: Human communication and Business Organisation

Aim: *Human Communication:* to provide candidates with the necessary written and verbal communication skills to enable them to relate to others on computing and non-computing matters.

Business Organisation: to give the candidate an understanding of the information needs of organisations, the various types of organisation and the principal functional areas within organisations.

3: Projects

Aim: To give candidates the opportunity to put into practice concepts learnt during the course. Projects are split into a number of phases (defined in the marksheets provided). Each phase should be completed by the students and signed-off by the tutor following a pre-determined schedule.

3.1 Web Design Project: The aim of this project is to give students a basic understanding of web-design. The task assigned will be in the form of a simple and static multi-page website.

3.2 Database Project: The aim of this project is to allow students to apply the theory learnt throughout the course. This project will be based on forms and GUI driven database creation. No knowledge of query languages is required.

3.3 Human Communications and Business Organization Project: This task will help students develop their research and presentation skills. Candidates can pick any aspect from business organization and human communication, and are expected to gather and collate information which will then be used to design and deliver an 8-10 minute presentation.

Assessment Procedure

Modules 1 and 2 are assessed on the basis of *ONE* WRITTEN EXAMINATION PAPER AT THE END OF THE 2-YEAR COURSE.

Module 3 is assessed on the basis of a set of *three* school-based exercises carried out by the candidate during the course of study, monitored and assessed by the tutor and moderated by the markers' panel. All marks are to be submitted to MATSEC not later than the date stipulated by the MATSEC support unit.

Note on Private candidates: Private candidates are to submit all exercises for assessment to the MATSEC Support Unit by the date stipulated by the unit. Candidates may be called for an interview about their work.

Weightings for final Grade

		Module	% Weighting
Examination Paper (3 hours)	Section A	Computing Principles	50
	Section B	Human Communication & Business Organisation	20
Set Exercises			30

Written Section
1) Candidates must obtain a satisfactory mark in the written component
2) Candidates can obtain a grade between A and C (inclusive) if they satisfy the examiner in the written component, irrespective of the total marks obtained.
     a. This will reflect the fact that the written component is a crucial piece of the entire examination. This will test the candidates' theoretical knowledge, including material used in their projects.

Projects
1) Three compulsory projects will be set during the course. All three must be submitted for candidates to be able to get a passing grade. If any of the three projects is not presented, the candidate will not be eligible to get a grade between A and E.
     a. Candidates may re-submit any project/s in a successive session if they fail to satisfy the examiners in any one of the given projects in the first session.
2) All candidates may be called for an interview on their projects
3) Private candidates will be expected to present their lab-books. The project is to be carried out under the supervision of an Information Technology teacher who is currently teaching IT in one of the schools approved by MATSEC.
4) Weighting for each project
     a. Database Project 14%
     b. Web Design Project 10%
     c. Human Communication and Business Organisation Project 6%

Two lab-books are to be presented at the end of the course, one for the Database project and another for the web design project.
     a. The lab-book is to be organised following the template attached to this syllabus (Section 5). The front sheet (Section 4) is included in this document. An authentication form is required and is available for download from the Matsec website.

b. At the completion of each phase, candidates are to present their lab-book to their tutors for correction and marking (as indicated within the marking scheme in section 5).
c. It is up to the tutor to schedule the completion date of each phase
d. Eventually the lab-book will represent a complete project (also referred to as the documentation).
e. Candidates need to submit an authentication form, which is provided by Matsec.

Paper Structure

- Duration three hours.
- Maximum mark 70.
- This paper will consist of two sections.

Section A: Computing Principles (maximum mark 50)
- Questions are set on the syllabus content of Module 1.
- Seven questions are set as follows:
- One compulsory question based on DB and Web design project carrying 18 marks;
  - 9 Marks for DB project related questions
    - Given a scenario, questions of a simple nature are set, such as
      - Draw an Entity Relationship Diagram from a given scenario
      - Highlight all Primary Keys
  - 9 Marks for Web project related questions
    - Questions of a simple nature, including definitions of terms used in the project

- Six questions, to choose four, each carrying 8 marks.

Section B: Human Communication and Business Organisation (maximum mark 20)
- Questions are set on part of the syllabus content of Module 2.
- Three questions are set as follows:
  - One compulsory question, consisting of short questions and carrying 10 marks;
  - Two questions, to choose one, each carrying 10 marks.

Grading
The final grade will be based on an overall aggregate score in written paper and exercises, and candidates must obtain a minimum mark in the paper to be established by the Markers' Panel.

Re-sit
Candidates who fail to meet the criteria for a pass will have to re-sit the examination. Project marks may be carried forward for subsequent sessions based on this syllabus.

1: COMPUTING PRINCIPLES

1.1 INFORMATION SYSTEMS

1.1.1 THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TODAY

By the end of this section the student should be able to:
- Clearly distinguish between data and information, and appreciate the relevance of information in modern organisations.
- Clearly understand computer-related crime and the counter-measures employed to combat such crime.
- Appreciate the need for data protection legislation.
- Have a basic understanding of how ICT is affecting various areas in modern society.
- Understand the methods that organisations may use to fulfil their information requirements.
- Discuss the need for, and describe, a corporate information security policy.
- Appreciate the need for organisations to have an IS strategy.

1.1.1.1	Data and Information	1. Definition of Data
		2. Definition of Information
		3. The input-process-output cycle – information obtained by processing of 'raw' data.
		4. Direct and indirect sources of data. The importance of quality of data /information (i.e. up-to-date, accurate and complete).
		5. The significance of data and information to modern organisations – ability to take effective decisions for the benefit of organisations (such as entering a new market and carrying out research into a promising area).
		6. External and internal forms of data with respect to organisations.
		7. Modern organisations and individuals are subjected to overexposure to data and information. The need to find only what is required, when it is required (Information Overload)
		8. The notion of the Information Society – a society based on information and knowledge (knowledge workers)
		9. The use of ICT to facilitate data organisation. Benefits and limitations of ICT systems. a. The use of the internet as a search tool. b. Search engines and search techniques (such as the use of wildcards). c. On-line libraries (e.g. electronic journals).
		10. Use of forums
1.1.1.2	Computer-related crime	1. A society based on information is threatened by itself. Data/information has become vital to most organisations/individuals that they may seek illegal ways of obtaining it.
		2. A new type of crime – computer based crime. Defining computer crime/computer misuse. Authorities were initially unprepared.
		3. Categories of illegal practices – a. Hacking. b. Theft (money, data, etc). c. Computer based fraud (phishing and fraudulent traders).

		d. Malicious code – viruses. 4. The Internet as a means to perpetuate these crimes beyond physical borders. 5. Modern legislation has been introduced to combat computer/digital crime 6. Software copyright laws – main issues (illegal to make, use and transmit unauthorised copies to other users). 7. Definition of Plagiarism and contrast with piracy 8. Definition of an information security policy as a means to reduce the effects of computer crime
1.1.1.3	Data protection legislation	1. The need to protect individual privacy in lieu of the fact that an individual's personal details are relatively easier to access online than in previously used systems. 2. Principles of data protection and the data protection act (Malta). The use of gov.mt and DOI websites is encouraged. 3. Exemptions (e.g. due to national security reasons). 4. Defining a data subject (i.e. persons whose details are stored in some database). Their rights. 5. The role and duties of the Data Protection Registrar/Commissioner
1.1.1.4	ICT related legislation in organisations	1. Aspects of software copyright, licensing and having backup copies allowed (fair-use)

1.1.1.5	ICT in the modern society	1. An awareness of the limited role of computing in the past and its much wider role today
		2. Typical examples of ICT use today would be*:
		    a. Tele-working.
		    b. The changing nature of work and employment resulting from ICT.
		    c. ICT and leisure – ICT related entertainment, 'chatting', booking of holidays, flights etc via use of ICT.
		    d. Use of ICT to air views/opinions/share resources.
		(*other topics such as e-commerce are listed individually and in more detail)

1.1.1.6	e-business	1. An overview of e-Business 2. History – Emergence of online shops and online advertising 3. Definition of Internet Commerce 4. Advantages to business and to customers 5. Disadvantages to business and to customer 6. Definition of business to business (B2B) 7. Definition of business to consumer (B2C) 8. Definition of e-Marketing 9. Definition of e-Markets (e.g. eBay) 10. The use of ICT to gain competitive advantage

1.1.1..7	e-government	1. Overview of eServices
		    a. Admin to Admin (e.g. Inter-departmental data requests).
		    b. Admin to Business (e.g. e-Procurement).
		    c. Admin to Citizen (e.g. Requesting birth certificate).
		2. Informational vs. Transactional e-Services (applications, payments, licenses)
		3. Definition of life events

		4. Use of portals (E.g. gov.mt) 5. Definition of an Electronic Identity (and examples of usage)
1.1.1.8	e-learning	1. Definition of e-learning 2. Definition of Learning Management Systems (e.g. Moodle) 3. Advantages and Disadvantages of e-Learning

1.1.1.9	ICT in Science and Engineering	1. Give an outline of the following:
		    a. Design tools – CAD.
		    b. Simulation – traffic, piloting (air and sea).
		    c. Data tracking systems, telemetry.
		    d. Geographic Information System (GIS).
		    e. Weather forecasting.
		    f. Statistical packages (e.g. SPSS).

1.1.1.10	Health and Safety	1. Computers and health – people are using ICT more than ever before and are hence exposed to hazards that were not common in the past
		 2. Stress, Repetitive Strain Injury (RSI), Eyestrain, Extremely Low Frequency (ELF) radiation.
		 3. The ergonomic environment – recommendations regarding the design of the ICT work environment
		 4. Health and safety –
		    a. Ownership of workspace by employees.
		    b. Taking regular breaks from the working area.
		    c. Provision of the right furniture and equipment.
		 5. The responsibilities of the employer.

1.1.2 INFORMATION: THE TOOLS REQUIRED TO HANDLE IT

By the end of this section the candidate should be able to:
- Define the basic components of a computer system.
- Understand the basic characteristics of a typical microprocessor.
- Be aware of typical input devices currently in use.
- Be aware of typical storage devices currently in use.
- Be aware of typical output devices currently in use.
- Distinguish between the main processing modes in current use.
- Define the main issues relevant to network environments in modern organisations.
- Understand the importance of user interfaces for IS and the main types of user interfaces found today.
- Appreciate some basic aspects of human-computer interaction (HCI).
- Appreciate the fact that all data in computers is stored in binary format and that the most frequently used number bases are binary and hexadecimal.
- Demonstrate an understanding of the different data representations.
- Understand why various methods of representing numbers in a computer exist.
- Understand the issues related to data verification and data validation, relevant to IS.
- Appreciate that various verification and validation techniques exist to minimize the number of errors in data storage/transmission.

1.1.2.1	Computer system	1. Outline of a computer system as consisting of various components (I/O, processor, main memory, auxiliary storage). Type of components may vary and depend on requirements.
		2. Main categories of computers currently in existence. Define the following with examples of typical area of use
		   a. Mainframes.
		   b. Supercomputers.
		   c. Servers.
		   d. Desktops.
		   e. Laptops.
		   f. Notebooks.
		   g. Netbooks.
		   h. Tablet PCs.
		   i. PDA/Smartphones.

1.1.2.2	The processing unit	1. Overview of a typical microprocessor (ALU, CU, registers, buses as channels through which the various components are linked). 2. Main types of RAM and ROM currently in use. 3. ASCII and UNICODE as a means to represent characters
1.1.2.3	Input devices	Brief overview of main input devices (no technical details required). Important to indicate the advantages and disadvantages of each and hence the environment in which they should be used.
1.1.2.4	Storage devices	1. Notion of primary and secondary storage. 2. The hard-drive as a magnetic storage device. What are the advantages and disadvantages of using it? 3. Main types of optical-based storage devices together with their advantages and disadvantages 4. Definition of flash-memory and solid state drives (SSD)
1.1.2.5	Output devices	Brief overview of main output devices (no technical details required). Advantages and disadvantages of each and areas of application of each.

1.1.2.6	Processing modes	Understand the principles of 1. Batch processing (e.g. Payroll at end of month) 2. Master files and transaction files. 3. Online processing (e.g. POS) 4. Real-time processing (e.g. Airline ticketing system, aircraft autopilot system) For each of the above processing modes, explain the criteria upon which they would be chosen.

1.1.2.7	User interface and HCI in IS	1. Understanding the basic psychological factors that are needed to design good software.
		     a. Distinguishing between short term human memory and long term memory and their relevance on software design.
		     b. Text versus graphics – pros and cons.
		2. Define the main interface styles together with their advantages and disadvantages
		     a. Command Line Interface (CLI).
		     b. Graphical User Interface (GUI).
		3. Emerging technologies
		     a. E.g. Speech recognition and eye movement tracking.

1.1.2.8	Information Systems	Decision making is the process of selecting the most desirable or optimum alternative to solve a problem or to achieve an objective. The quality of these managerial decisions largely depends on the information available to that decision maker. Decision making is classified on three levels:
		     a. *Strategic* decisions are future-oriented because of uncertainty. They are part of the planning activity.
		     b. *Tactical* decision making combines planning activities with controlling. It is for short-term activities together with the associated resources allocated to achieve the objectives.
		     c. *Technical* decision making is a process of ensuring efficient implementation of specific tasks.
		Candidates must be able to understand and define each level, while giving examples of Information Systems which aid in the respective level.

1.1.2.9	Networks in organisations	1. Types of networks commonly used: LAN and WAN. Advantages and disadvantages of networks.
		2. Definition of PAN and MAN
		3. Common LAN topologies (Star, Ring, Bus, Mesh).
		4. Server-based vs. peer-to-peer networks.
		5. What is the Internet?
		6. Overview of Internet structure – mesh of interlinked networks
		7. Communications media used.
		     a. Wired
		        i. Fibre Optic.
		        ii. Twisted Pair.
		        iii. Coaxial.
		     b. Wireless
		        i. Microwave.
		        ii. Bluetooth.
		        iii. WLAN.
		8. Narrowband vs. Broadband technologies (e.g. DSL)

		9. The use of bridges and gateways to link different networks together.
		10. Overview of Synchronous and Asynchronous transmission.
		11. Factors affecting the rate of data transmission.
		    a. E.g. Interference and Noise.
		12. Definition of protocols as standards
		    a. HTTP, HTTPS, TCP/IP, FTP.
		13. Direction of transmission (simplex, half-duplex, full-duplex).
		14. Serial and parallel transmission.
		15. Definition of the Internet protocol (IP)
		16. Definition of cloud computing

1.1.2.10	Data validation and verification in IS	1. The importance of accuracy and validity of the data.
		2. Categories of common errors.
		3. Validation Checks to include
		    a. Presence check.
		    b. Format check.
		    c. Range check.
		    d. File look-up check.
		    e. Look-up list check.
		    f. Parity (Even and odd).
		    g. CRC (Definition only).
		4. Verification versus Validation.

1.2 SOFTWARE AND SYSTEM DEVELOPMENT

1.2.1 CATEGORIES OF SOFTWARE

At the end of this module, students should be able to:
- Distinguish between the major categories of software;
- Describe the functions of the basic components found in an operating system;
- Understand the notions of software capabilities with reference to upgradeability, ease of use and reliability;

1.2.1.1	Software categories	1. Main two categories are System Software and Application Software. 2. Definitions of each.

1.2.1.2	System Software	1. Types of
		  a. Operating system.
		  b. Utility programs such as antivirus, archivers (compression) and defragmenters.
		  c. Translators (compilers, interpreters and assemblers).
		  d. Monitoring software for both hardware and software.
		  e. Communication software.
		2. Candidates should know that several Operating systems contain most of the system software above. Candidates are expected to be familiar with the properties and capabilities of the various types of system software.

1.2.1.3	Application software	1. Types of:
		  a. Bespoke/Custom.
		  b. General purpose (generic).
		  c. Application generators.
		  d. Integrated and software suites.
		2. Advantages and disadvantages of each type
		3. The scenarios in which each type of software may be applied

1.2.1.4	Operating System (OS)	1. Purpose of OS. Candidates should know that the OS is software that controls all operations.
		2. Components of OS.
		  a. Kernel (supervisor or control program).
		  b. Memory manager.
		  c. Input/Output manager.
		  d. Backing store manager.
		  e. Resource allocation and scheduler.
		  f. Accounting.
		  g. Error handling.
		  h. Security.
		3. Interface between hardware and user.
		4. Types of operating systems.
		  a. Single program OS
		  b. Multitasking
		  c. Multiprogramming
		  d. Networked.
		5. Command line interface and GUI
		6. Candidates are expected to be to list several examples of operating systems (Windows, Linux, MAC OS etc...)

1.2.2 DATABASE SYSTEMS

At the end of this module, students should be able to:
- Describe the nature and purpose of database systems and how they work;
- Describe the function of tools readily available in database packages;
- Appreciate the advantages of relational database systems over traditional file systems;
- Describe the components of a database management system (DBMS);

1.2.2.1	Introduction	1) Filing systems
		      i) Manual filing systems (e.g. filing cabinets and card indexes)
		    b) Traditional file-based systems
		      i) E.g. Applications operating on isolated data
		      ii) Limitations of flat-file approach
		        (1) Problem of data isolation
		        (2) Problem of data duplication (redundancy)
		        (3) Problem of program/data dependence
		2) Relational Database Systems
		    a) Advantages over traditional filing systems
		    b) Issues to be considered
		      i) Data consistency.
		      ii) Portability.
		      iii) Data redundancy.
		      iv) Security.
		      v) Complexity.
		      vi) Cost.
		      vii) Data size.
		      viii) Robustness.

1.2.2.2	Relational Data Model	1. Table (relation) organisation
		2. Definition of entity
		3. Definition of Field (attribute)
		4. Definition of Key field (primary key)
		5. Definition of Secondary key
		6. Definition of Record (tuple).
		7. Links between tables (relationships)
		8. Definition of foreign key.
		9. Representation of relational tables by the use of the following notation
		    a. The name of each table (relation) is followed by a list of all the fields in brackets
		    b. Key fields are underlined and foreign keys are in italic
		    c. Entity name in block capitals whereas field names are in lower case
		10. Field types to be used in relational tables: text, numeric, date, Boolean and memo.

1.2.2.3	DBMS	1) Definition of a database management system (DBMS) 2) Definition and use of Data Dictionary 3) Definition and use of File Manager 4) Definition of Data Description Language 5) Definition of Data Manipulation Language 6) Definition of Data Query Language 7) Role of Database Administrator (DBA) 8) Security (Access Rights)
1.2.2.4	Conceptual model	1. Design of the conceptual model, irrespective of DBMS type to be used. 2. Entities, attributes and relationships 3. Entity-Relationship (E-R) diagrams.

		4. Cardinality
		   a. One-to-one.
		   b. One-to-many.
		   c. Many-to-many.

1.2.3 INTERNET-RELATED SOFTWARE

At the end of this module, candidates should be able to:

- Describe Internet-related terms.
- Describe the capabilities of Internet-related client applications.
- Try most of the Internet utilities listed below.
- Appreciate that all Internet applications and utilities run on top of standard protocols.
- Appreciate existence of software to improve security.
- Understand basic HTML principles.

1.2.3.1	Introduction to the Internet	1. How the Internet was developed. 2. Internet structure 3. Internet registries 4. Domain names 5. DNS and TLD 6. Intranets and Extranets.
1.2.3.2	Basics of HTML, CSS and Javascript	1) Definition of HTML 2) Definition of CSS 3) Definition of Javascript 4) Sitemap (Organigram)

1.2.3.3	WWW	1) Definition of
		   a) Internet service provider.
		   b) Web site.
		   c) Web page construction.
		   d) Web server.
		   e) Web browser (URL, Bookmark and History).

1.2.3.4	Internet protocols	1) Purpose and definition of
		   a) SMTP.
		   b) POP and IMAP.
		   c) FTP.
		   d) HTTP.
		   e) TCP/IP.

1.2.3.5	Internet client applications	2) Internet is not just the WWW. Other utilities are:
		   a) E-mail (e.g. Mozilla Thunderbird).
		   b) FTP (e.g. Filezilla).
		   c) Groups (e.g. Google/Yahoo groups).
		   d) Video conferencing.
		   e) RSS (E.g. Reading feeds from clients such as MS Outlook).
		   f) Amalgamated services (e.g. Google Talk, Windows Live Messenger, Yahoo Messenger, Skype).
		3) Students are expected to describe the purpose, features, advantages and disadvantages of each software utility
		4) Awareness of mobility
		   a) Connecting to the Internet via mobile phone.
		   b) Advantages and disadvantages.

1.2.3.6	Internet Security problems	1) Internet based fraud (e.g. phishing, password hacking, brute force attacks, social engineering) 2) Malware a) Worms.

		b) Viruses.
		 c) Key loggers.
		 3) Some solutions to these problems
		    a) Encryption.
		    b) Firewalls.
		    c) Antivirus software.
		    d) Digital Signatures and Certificates.

1.2.5 SYSTEM DEVELOPMENT

By the end of this module, students should be able to:
- Plan a time schedule to complete system objectives.
- Investigate client requirements and set objectives during the design phase.
- Use structured techniques involved in system design.
- Produce the final documentation of the system being developed.

1.2.5.1	Planning	1) Before a system starts taking shape it must go through a number of development stages each of which must be well planned. Candidate learns how to plan a time schedule keeping in mind that all objectives are to be realistically chosen and achieved in the time frame available 2) This section is to be based on the waterfall model
1.2.5.2	Analysis Problem Identification and Investigation	1) Problem must be completely understood before solving it systematically. 2) Candidates are expected to practise methods for collecting information such as interviews, questionnaires, observations and inspection of documents.
1.2.5.3	Feasibility Study	1) Candidates are expected to practise writing feasibility study reports based on the outcomes of the investigation. 2) TELOS: Technical, Economic, Legal, Operational and Social aspects should be considered
1.2.5.4	System and information requirements	1) Input and output formats. 2) System type such as single/multi user, on-line, batch or real-time. 3) Storage requirements. 4) User interface needs. 5) Processing requirements. 6) Proposal of alternative methods of solution
1.2.5.5	Design	1) A solution is chosen from the alternatives defined in the previous phase. Reasons of choice are to be documented. Criteria considered could be costs, needs for development, knowledge and time frame available. 2) A suitable paradigm for implementation of software should also be selected. 3) Selection of existing software tools. 4) Definition of structured techniques. Top-down and bottom-up approaches. 5) Database Requirements (Entity-Relationship Diagrams, Normalised tables) 6) Choice of data types. 7) Human Communication Interface. Input and output formats. 8) Data capture and validation methods. 9) Description of testing strategy for individual components and for testing overall system (dry run, unit testing, integration testing, test data and expected outcome, black box and white box testing).
1.2.5.6	Implementation and testing	1) Mapping of designed modules into a programming paradigm or application generation tool.

		2) Actual testing is carried out according to chosen testing strategy. 3) System testing (alpha and beta testing, acceptance testing). 4) System implementation method (parallel, direct, pilot or phased). 5) Staff training. 6) Conversion of data files. 7) User's guide and technical documentations.
1.2.5.7	Maintenance	1) How technical documentation makes a system easier to maintain 2) Issues with maintenance if system is badly designed/documented

1.2.5.8	System evaluation	1) System evaluation based on
		    a) Usability.
		    b) Effectiveness.
		    c) Maintainability.

2: HUMAN COMMUNICATION AND BUSINESS ORGANISATION

2.1 HUMAN COMMUNICATION

At the end of the module candidates should be able to:

- Describe the nature of communication;
- Understand different means of communication;
- Appreciate communication-related technologies, their basic functions and relative advantages;
- Appreciate the power of the Internet as a means of human communication;
- Understand the information structures used for dissemination of information internally and also externally;
- The need for user support in IS-based organisations and the basic elements of user support systems.

2.1.1	Introduction to Communication	1. What is communication?
		2. The communication model.
		3. Different types of communication:
		    a. Verbal, written and visual.
		4. How electronic communication is affecting business:
		    a. Tele-working.
		    b. Internet. (in brief as it will be covered in a later section).
		    c. Video Conferencing.
		5. E-Government
		    a. Information about online government services

2.1.2	Verbal communication	1. The advantages and disadvantages of verbal communication.
		
		2. Related technologies – features and advantages
		    a. Telephone.
		    b. Mobile telephony.
		    c. VoIP.
		    d. Satellite telephony.
		    e. Voice-mail.

2.1.3	Written communication	1. The advantages and disadvantages of written communication
		
		2. The concept of written media: content, structure, style, layout.
		    a. Examples: Letter, memos, reports, Curriculum vitae, minutes.
		
		3. Related technologies – main features and advantages
		    a. Word-processing.
		    b. E-mail.
		    c. Document systems (such as groupware and workflow systems).
		    d. Blogs.
		    e. Wikis.
		    f. Microblogging.
		    g. Social Networks.

2.1.4	Visual communication	1. The effects of visual communication a. Examples: Posters, wall charts, notice boards, photographs, films, slides and videos, presentations and visual aids.

		2. Related technologies – main features and advantages.
		   a. The traditional printing process – books, newspapers, journals.
		   b. Desktop publishing.
		   c. Digital Image Processing
		      i. Basic photo editing, to include: resizing, manipulating and compressing images (e.g. JPG, GIF) due to bandwidth considerations, stitching of images, red-eye removal and horizon straightening.
		   d. Facsimile machine.
		   e. Photocopier.
		   f. Television.
		   g. Presentations.
		   h. Online video/presentations.

2.1.5	The Internet as a Human Communication Media	1. Description of Internet utilities that can be used as human communication tools:
		   a. Email.
		   b. Chatting.
		   c. Newsgroups.
		   d. Discussion Groups.
		   e. Web Conferencing.
		   h. Blogging.
		   i. Wikis.
		   j. Micro-blogging.
		   k. Social Networks.
		2. The student should know how one could use the above services in a business both in internal and external communications.
		
		3. Advantages and disadvantages of the internet as a communication tool.

2.1.6	Internal communication in an organisation	1. Structures for dissemination of information such as
		   a. Use of a knowledge base (e.g. Collaboration and internal wiki) to disseminate information
		
		2. Upward Communication: Purpose and content of reports, suggestion scheme systems, interviews, communication from trade unions to management, staff development and appraisal. The usage of report skeletons before drafting reports.
		
		3. Downward Communication: Purpose, policies of communication, different methods that a company can use in order to communicate with employees (e.g. magazines, induction manual, annual reports, letter, notice board, pay envelope inserts, staff appraisals and email).
		
		4. Definition of
		   a. Lateral Communication.
		   b. Grapevine.

2.1.7	External communication in an organization	1. Why does a company have to spread information to the outside world?
		   a. Suppliers (what info should they know).
		   b. Customers (present and future).
		   c. Public relations.
		
		2. Different methods used to spread information:

		a.	Newspaper.
		b.	Letters to customers.
		c.	Forum.
		d.	User groups.
		e.	Blogging.
		f.	Social networking.
		All in the context of being used by organisations to improve communication with other parties, customers, suppliers, governmental Agencies and other entities	
2.1.8	User support systems	1.	The need for support within the organisation and to external customers.
		2.	Characteristics of a 'help desk' and help desk software that may be in use today.
		3.	Aspects of technical support.
		4.	Role of forums (technical and user forums), user booklets, newsletters, live-chat and support articles
		5.	Support over the Internet – online help.
		6.	The role of 'traditional' documentation such as manuals.

2.2 BUSINESS ORGANISATION

2.2.1 ORGANISATIONS

Upon successful completion of this module the students should be able to:

- Describe the different types of organisation in the public and private sector;
- Describe the fundamental characteristics of an organisation;
- Construct an organisational chart showing the various working relationships;
- Outline various functional areas within organisations;
- Understand the activities that take place in various departments;
- Understand how change can be managed.

2.2.1.1	Formation of organisations	1.	What is an organisation?
		2.	Behavioural science; from Barter Trade to Modern Organisations; specialisation; profit/non-profit-making organisations.
2.2.1.2	Types of organisations	1.	Economics systems - Mixed Economies.
		2.	Organisations in the Private and Public Sectors: Definitions, advantages and disadvantages of:
			a. Sole Trader.
			b. Partnership.
			c. Private (Ltd) and Public (Plc) Companies.
			d. Co-operatives.
			e. Public sector entities.
2.2.1.3	Characteristics of organisations	1.	Essential components of organisations;
		2.	Open vs. Closed systems;
		3.	Formal vs. Informal organisations;
		4.	Authority, responsibility and delegation;
		5.	Centralised and Decentralised;
		6.	Decision-making management functions.
2.2.1.4	Organisational Structure	1.	Departmentalisation

		a. By Function; by Product; by Location; by Project 2. The Organisational Chart a. Hierarchical, Horizontal and Matrix 3. The role of the Chief Information Officer (CIO) and the Chief Security Officer (CSO)

2.2.1.5	Introduction to Functional Areas	1. Brief definitions of the various functional areas
		   a. Sales.
		   b. Finance.
		   c. Marketing.
		   d. Administration.
		   e. Human Resources.
		   f. Production.
		   g. Procurement/Purchasing.
		It is acknowledged that other areas do exist, and some of the areas mentioned above may also be integrated, particularly in smaller organizations
		2. Briefly explain the work carried out by each function
		3. The duties and responsibilities of the personnel at various levels within each functional area.
		4. Developing an organisational chart

2.2.1.6	Managing Change	1. Factors leading to change; 2. Classical example is the introduction or development of an information system: this will result in change that must be managed. Factors could include re-skilling, attitude, organisational structure, employment pattern and conditions as well as internal procedures. 3. Overcoming resistance to change

3:   EXERCISES

3.1 GUIDELINES ON EXERCISES

Problems chosen by students should be realistic and reasonable in the sense that the objectives planned may be implemented in the time-frame available. Candidates should be encouraged to use different sources of information – books, Internet, newspapers and journals.

In marking the assignments, credit will be given to the inclusion of the appropriate features as described in the following sections. All the required templates for projects are provided within this document (including front-page and document structure).

3.2 GENERIC SOFTWARE

This section will equip students with a better foundation for the delivery of higher quality projects.

- Become conversant with the nature and capabilities of the most common generic software;
- Improve their development skills by using generic packages namely word-processing, spreadsheet and database.

5.2.1	Word processing (not examinable)	1. Page layout 2. Formatting 3. Spell and grammar checkers 4. Styles and proper formatting (Header levels) 5. Automated Index and Table of Contents creation 6. Template creation
5.2.2	Spreadsheet (not examinable)	1. Creation of charts and graphs 2. Pivot tables
5.2.3	Database	1. Creation of well organised and linked relational tables 2. Field data types: numeric, string, Boolean and date 3. Enforcement of referential integrity. 4. Queries 5. Forms and Reports 6. Use of macros 7. Creation of customised menus 8. Execution of multi-table queries.

The operation and use of particular generic software will not be assessed. However, examination questions will assume a reasonable level of knowledge and understanding of the capabilities of database, word-processing and specific reporting aspects of spreadsheets

3.2 WEB DESIGN PROJECT

Web Design Project	Mark
System analysis and problem formulation	**10**
Problem Definition [200 to 300 words]	7
Scope (what you will be tackling in the project) [100 to 200 words]	3
Client Requirements	**15**
Background of the problem	5
Detailed requirements list	5
Possible Solutions	5
Selection and Solution Design	**20**
Advantages of the website to the company [200-300 words)	2
Site-map (Organigram)	5
Draft design showing basic know-how of common design principles (e.g. location of logo and menu, colour scheme, use of proper fonts and sizes, accessibility and readability). All iterations of 'pen and paper' or software-based designs are to be submitted.	5
Bandwidth considerations (e.g. BMP vs. JPG images, size of files)	3
Test Plans (Including black-box testing and requirements coverage) *Planning for: Visual Tests (e.g. resizing issues and resolution), Cross-browser Compatibility and Requirements Coverage*	5
Implementation	**20**
Five different pages. Must include Home page and a minimum of 4 other pages	10
Page title (relevant to every page)	1
Meta tags (Author, keywords and description)	1
Tables for tabular data	2
Hyperlinks (Internal links and anchors)	2
Hyperlinks (External)	1
Mail-To facility	1
Use of images with alternate text (All sources should be acknowledged in documentation)	1
Page footer with Copyright notice and date.	1
Testing	**10**
Implementation of test plan (and test results)	7
Screen shots of pages	3
Evaluation of Complete System	**5**
System evaluation (what was implemented vs. scope of project)	2
Future enhancements	2
Skills acquired	1
Quality Assurance: Overall Objectives and Quality of Project	**20**
Test under HTML validator: http://validator.w3.org (100% validation is not required)	5
Printouts in at least two different browsers (e.g. IE 7+, Firefox, Chrome and Safari)	1

All links must be functional	2
Proper folder structure is to be used (e.g. images in different folder than pages)	2
Works without horizontal scrolling in 1024x768	2
Images are not resized using HTML, but properly resized using a photo editor	2
Legibility (contrast between text and background, text size and font considerations)	1
Overall presentation and layout of documentation which must include: *Table of Contents, Header and footer, page numbering, good use of fonts and styles, images inserted within margins. Reference list using APA citation style.*	5

Any text editor or web authoring tool may be used, however content management systems (CMSs) cannot be used.

3.3 DATABASE PROJECT

Database Project Structure	Mark
System analysis and problem formulation	10
Problem Definition [200 to 300 words]	7
Scope (what you will be tackling in the project) [100 to 200 words]	3
Client Requirements	15
Background of the problem	5
Detailed requirements list	5
Possible Solutions	5
Database Design	20
Selected Solution	3
Entity Relationship Diagrams	5
Design of data Validation rules	5
Field types well chosen and explained (including default values)	2
Test Plans (Including black-box testing and requirements coverage) *Black-box test-plan is to include the following fields in a tabular layout: Test Case no, Description, Expected Outcome, Actual Outcome (to be used later on) and Comments. Normal, abnormal and extreme test data is to be included. Requirements coverage should include a checklist of all the requirements agreed upon with the client. Actual coverage of such requirements will be checked at a later phase.*	5
Implementation	20
Creation of tables	5
Creation and use of forms for data entry	5
Creation and display of reports	5
Use of macros	2
Creation of switchboard	1
Use of Pivot Table and charts for reporting	2
Testing	10
Implementation of test plan (and test results)	7
Screen shots of forms, reports and all modules	3
Evaluation of Complete System	5
System evaluation (what was implemented vs. scope of project)	2
Future enhancements	2
Skills acquired	1
Quality Assurance: Overall Objectives and Quality of Project	20
Minimum of three tables	5
Minimum of two relations	3
Indication of Primary and Foreign Key	2
Minimum of one form per table	1
Minimum of one form with sub form	1
Well-structured and user friendly interface	1
Minimum of three reports with different groupings with their relative totals or other group	2
Overall presentation and layout of documentation which must include: *Table of Contents, Header and footer, page numbering, good use of fonts and styles, images inserted within margins. Reference list using APA citation style.*	5

This project has no close relation with any commercial or free office automation suite.

3.4 HUMAN COMMUNICATION AND BUSINESS ORGANISATION PROJECT

<u>Features in the human communication and business organisation assignment</u>

Coursework involves skills in information gathering, collation, design and presentation. The final form of coursework should be a slideshow presentation.

Candidates are expected to show how much they can exploit the characteristics of a particular medium to transmit the selected content.

Attention is to be given to the selection of content (image and text), composition, emphasis and use of colour.

Assignment criteria include:

1) Presentation length will be **between 8 and 10 minutes**.
2) Candidates will utilize a **minimum of 4 Power Point slides** (topic slide not included) and a **maximum of 20 slides**.
3) Candidates should submit an outline for this presentation and a **bibliography/references/works consulted page**.
4) Candidates will **select their own presentation topic**. This topic may be an issue discussed in class. The topic **must be relevant to the business environment**.
5) Candidates are expected to give a verbal in-class presentation.

Scheme	100%
Quality of presentation delivery	40%
Quality of slide content	30%
Quality of research and the way data was collected	20%
Overall quality (introduction, conclusion, use of multimedia/charts and length of presentation)	10%

4. PROJECT FRONT-PAGE TEMPLATE

Candidate Name

I.D.

Name of School

University of Malta
L-Universita' ta' Malta
MATSEC Examinations Board

[E.g.] 2013
IM 19: Information Technology
(Intermediate Level)

[E.g. Database] Project

5. LAB-BOOK TEMPLATE

Each project will be submitted in the form of a lab-book, which is built incrementally according to the phases listed for each project. The following is the overall structure expected. Each section from chapters 4 till 9 need to be signed and marked at each stage.

1. Front Page (See Chapter 4)	
o	Student Name
o	Student ID
o	Name of School
o	Submission Date
o	Subject Code and Name
o	Project Type (e.g. Programming Project)
2. Authentication Form	
o	Provided by Matsec and is to be filled before submitting project
3. Table of Contents	
4. System Analysis and Problem Investigation	
5. Client Requirements	
6. System Design	
7. System Implementation	
8. Testing	
9. Conclusion and Evaluation	
10. References (APA)	

6. BOOKS

The following books may be used as textbooks and/or as reference books. Apart from the list below, tutors are encouraged to supplement their courses with publications and resources from various academic and technical sources. This will ensure that the course content is updated and well balanced.

Database Concepts and DBMS

- Oppel, Andy. Databases DeMYSTiFieD, 2nd Edition, McGraw-Hill Osborne Media, 2010. ISBN-13: 978-0071747998

ICT

- Alter, Steven. Information Systems: Foundation of E-Business (4th Edition), Prentice Hall, 2002. ISBN-13: 978-0130617736

- Gardner, Alan; Lyon, Carl. Oxford Revision Guides: AS & A Level ICT Through Diagrams, Oxford: OUP, 2009, ISBN-13: 978-0-19-918093-6

- Doyle, Stephen. Essential ICT A Level: Essential ICT for WJEC AS Level (Essential ICT), Oxford: OUP, 2008, ISBN: 1850084130

- Snyder, Lawrence. Fluency with Information Technology: Skills, Concepts, and Capabilities (4th Edition), Prentice Hall; 4 edition, 11 Feb 2010. ISBN-13: 978-0136091820

- Williams, Brian. K., Sawyer, Stacey. Using Information Technology, McGraw-Hill Higher Education; 8th edition, 1 Feb 2009, ISBN-13: 978-0073516752

- Rainer, Kelly R., Turban, Efraim. Introduction to Information Systems: Supporting and Transforming Business, John Wiley & Sons; 2nd Edition edition (30 July 2008), ISBN-13: 978-0470169001

- 'A' Level Computing (4th ed), by P.M. Heathcote (2000), Payne-Gallway Publishers Ltd, ISBN 1-903112-21-4

- The Complete A-Z ICT & Computing Handbook, by Bob Penrose and Bill Pollard, Hodder & Stoughton Ltd, ISBN 0-340-80277-4

- Understanding Computer Science for Advanced Level, (4th ed) by Ray Bradley, Stanley Thornes Ltd, ISBN 0-7487-4046-5

- 'A' Level ICT by Pam M. Heathcote, Payne-Gallway, ISBN 978-1904467137