L-Università ta' Malta

MATSEC
Examinations Board

IM 19 SYLLABUS

Information Technology

2025

(Updated October 2024)

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Introduction

The area of Information Technology (IT) is a very actual, pervasive, and critical area of study that is impossible to avoid in the context of modern business and other processes. It is important to create a knowledge and skills workforce targeted at supporting and boosting the modern digital economy. This course is meant to prepare candidates for applicative business-related and computer information-related courses as well as preparing candidates for work in industry in the information management fields.

The contents of the course include insights into the role and types of information systems in organisations as well as the techniques, technologies, and strategies used in supporting modern organisations and their processes. In this respect, this course aims to equip candidates with an appreciation, and understanding, to implement solutions that satisfy industry requirements. Candidates will also be provided with practical hands-on skills through their participation in projects involving web design.

The syllabus for IT at this level does not assume or require any prior knowledge or certification in the field of IT, and the specific intent of this course can be gleaned through the learning outcomes as listed under LO1 to LO3 in this syllabus.

List of Subject Foci

1. Information Systems
2. ICT in Organisations
3. Software

List of Learning Outcomes

At the end of the programme, I can:

LO 1. understand the various parts of a computing system in terms of hardware and Information Systems (IS) in organisations and the types of IS.

LO 2. understand the different types of technologies, the systems used in organisations, and the different organisational structures.

LO 3. understand software (system, online and application), and the use and modelling of data.

Learning Outcomes and Assessment Criteria

Subject Focus:	**Information Systems**
Learning Outcome 1:	**I can understand the various parts of a computing system in terms of hardware and Information Systems (IS) in organisations and the types of IS.**

Topic	Sub-Topic	Assessment Criteria
1.1 Information systems in organisations	1.1.1 Role of information systems	1) Define Information Systems (IS). 2) Outline the main functionality of IS for an organisation. *Limited to IS as a means of extracting the required information by the organisations.* 3) Define what constitutes internal and external information with respect to an organisation. 4) Distinguish between the two types of information listed in section 1.1.1 (3).
	1.1.2 Management information systems (MIS)	5) Define Management Information Systems (MIS). 6) Describe the role of MIS. *Limited to how managers are supported in their decision-making.* 7) Define Decision Support Systems (DSS). 8) Define data warehousing.
	1.1.3 Data capture	9) Define the methods commonly associated with data capture. *Limited to:* *i) Keying in the data;* *ii) Bar codes;* *iii) Magnetic stripe cards;* *iv) Radio Frequency Identification (RFID) including Near Field Communication (NFC);* *v) Quick Response (QR) codes;* *vi) Smart cards.*

Topic	Sub-Topic	Assessment Criteria
		10) Compare and contrast the main differences between the data capture methods listed in section 1.1.3 (9). 11) Give usage examples of data capture methods listed in section 1.1.3 (9). 12) Define the Internet of Things (IoT). 13) Give examples of the IoT. *Limited to physical devices that are interconnected and managed by an Internet connected device.* *Example - a lightbulb that can be switched on using a smartphone app is an IoT device, an Air Conditioning unit that is temperature-controlled from a smartphone app is also an IoT device.*
	1.1.4 Negligence in an IS environment	14) Define negligence in an IS environment. 15) Outline the effects of negligence in an IS environment. *In terms of the impact suffered by an organisation through data loss due to non-existent or inefficient back-up plans, data theft, and natural disasters.* 16) Give examples of actions that could be taken to mitigate effects listed in 1.1.4 (15).
	1.1.5 Training issues	17) Discuss the need for Information and Communication Technology (ICT) related training in modern organisations. 18) Compare and contrast the training requirements for managerial, technical, and administrative staff. 19) Distinguish between unsupervised computer-based training and instructor-led training.

Topic	Sub-Topic	Assessment Criteria
1.2 Tools required to handle information	1.2.1 Computer system	1) Define the main hardware components of a computer system. *Limited to:* *i) Central Processing Unit (CPU);* *ii) Main memory;* *iii) Auxiliary storage;* *iv) Input/ Output (I/O).* 2) Draw a simple Von Neumann architecture based on the components mentioned in section 1.2.1 (1). 3) Compare and contrast the main categories of computers currently in existence in terms of: i) relative computational speed; ii) relative data storage capacity; iii) typical I/O devices used. *Limited to:* *i) supercomputers;* *ii) servers (physical);* *iii) desktops (office, gaming, design, media);* *iv) laptops (in terms of mobility and processing power);* *v) smart computing devices, including smartphones, tablets, smartwatches and embedded systems (e.g. vehicles and household appliances).* 4) Give examples of typical applications of the main categories of computers as listed in section 1.2.1 (3).

Topic	Sub-Topic	Assessment Criteria
	1.2.2 Input devices	5) Outline the function of the main input devices. *Limited to:* *i) mouse;* *ii) trackball;* *iii) keyboard;* *iv) trackpad / touchpad;* *v) touchscreen;* *vi) microphone;* *vii) webcam;* *viii) game controller.* 6) Compare and contrast input devices listed in section 1.2.2 (5) in terms of suitability of use for a given activity. *No internal structural detail is required. Brand names should not be used.*
	1.2.3 Storage devices	7) Describe primary and secondary storage. 8) Define Random Access Memory (RAM). 9) Define Read Only Memory (ROM). 10) Outline the top-level concepts of magnetic storage technology. *Limited to the hard drive.* 11) Outline the top-level concepts of optical storage technology. *Limited to DVD-ROM and Blu-Ray.* 12) Define Solid State storage technology. 13) Give examples of devices using Solid State storage technology. 14) Compare and contrast the types of storage technologies in sections 1.2.3 (10) to (12). *Limited to their advantages and disadvantages.* 15) Give examples of uses and applications for sections 1.2.3 (10) to (12).

Topic	Sub-Topic	Assessment Criteria
	1.2.4 Output devices	16) Outline the main function of output devices. *Limited to:* *i) monitor;* *ii) built-in/integrated displays;* *iii) touchscreens*; *iv) digital projectors;* *v) Virtual Reality (VR) /Augmented Reality (AR) headsets;* *vi) speakers/ headphones (wired/ wireless);* *vii) printers (inkjet, thermal, laser, 3D printer) and plotters;* *viii) haptic feedback devices (game controllers, wearables).* 17) Compare and contrast output devices listed in section 1.2.4 (16) in terms of suitability of use for a given activity. *No internal structural detail is required. Brand names should not be used.* 18) Define the following terms in relation to visual output devices: i) resolution (in terms of pixel count); ii) display size (measured diagonally); iii) aspect ratio. 19) Define the following terms in relation to printing devices: i) resolution (dots per inch (dpi)); ii) print speed (pages per minute (ppm)).
	1.2.5 Processing modes	20) Define the following processing modes: i) Batch (e.g. Payroll at end of month); ii) Online (e.g. Web Applications); iii) Real-time (e.g. aircraft autopilot, manufacturing control, etc.).

Topic	Sub-Topic	Assessment Criteria
		Limited to systems that are purely one type or another. Systems that exhibit hybrid behaviour, i.e. behaviour spanning more than one type of system, should not be included. 21) Give examples of real-world application for each of the processing modes listed in section 1.2.5 (20). 22) Compare and contrast each of the processing modes listed in section 1.2.5 (20).
	1.2.6 User interface in IS	23) Define the following interface technologies: i) Command Line Interface (CLI); ii) Graphical User Interface (GUI); iii) virtual and augmented reality interaction; iv) interaction through voice recognition; v) haptic interaction; vi) virtual surfaces; vii) eye movement tracking; viii) gesture recognition. 24) Compare and contrast the advantages and disadvantages of the interface styles mentioned in section 1.2.6 (23). 25) Give examples where the technologies mentioned in section 1.2.6 (23) (vi-viii) may be used.
	1.2.7 Number base systems	26) Define the following number base systems: i) Binary; ii) Decimal (denary).
	1.2.8 Data validation and verification in IS	27) Outline the importance of accuracy and validity of data. 28) Define data validation and data verification.

Topic	Sub-Topic	Assessment Criteria
		29) Outline the main validation checks. *Limited to:* *i) presence check;* *ii) format check;* *iii) range check.* 30) Outline the main uses of verification checks. *Limited to:* *i) parity (even and odd);* *ii) checksum;* *iii) proof-reading data;* *iv) double entry.* 31) Outline the common data errors. *Limited to transcription and formatting errors.*
	1.2.9 Networks	32) Define the term network. 33) List the advantages and disadvantages of a network. 34) Compare the types of networks commonly used. *Limited to top-level understanding of Local Area Network (LAN), Wide Area Network (WAN), and the Internet.* 35) Define the common network topologies. *Limited to Bus, Star, Ring, and Mesh topologies.* 36) Compare and contrast the common network topologies (as mentioned in section 1.2.9 (35)). *Limited to their respective advantages and disadvantages.*

Topic	Sub-Topic	Assessment Criteria
		37) Define server-based and peer-to-peer networks. 38) Compare server-based and peer-to-peer networks. *Limited to their respective advantages and disadvantages.* 39) Define the functions of modems, routers, and switches. *Limited to the top-level functions.* 40) Compare the use of the following wired media: i) coaxial; ii) twisted pair; iii) power lines; iv) fibre-optic. *Limited to their application and performance. No technical details are required.* 41) Compare the use of the following wireless technologies: i) Wi-Fi; ii) Bluetooth; iii) Near-field Communication (NFC). *Limited to their application and performance. No technical details required.* 42) Define cross-talk and spurious noise as examples of interference in data transmission. 43) Define Cloud Computing Technology.
1.3 Information policy, strategy and systems	1.3.1 Data and information	1) Give examples of the transformational effect of digitisation on information management, from the pre-digital era to the digital economy. 2) Distinguish between the value of data, information, and knowledge and how they relate to each other.

Topic	Sub-Topic	Assessment Criteria
		3) Define the input-process-output cycle in terms of an information system. *No reference to the input-process-output cycle at hardware level is expected.* 4) Explain the importance of quality of information. *Limited to keeping data/information up-to-date, accurate, and complete*. 5) Explain the significance of data and information to modern organisations. *Limited to the information's ability to help take effective decisions for the benefit of organisations.* 6) Outline the concept of 'Garbage in – Garbage out'. 7) Differentiate between direct and indirect sources of data. 8) Compare centralised and decentralised information approaches with respect to managing information across an organisation. *Reference to distributed ledger technologies is not expected.* 9) Define the notion of a Knowledge-based Society. 10) Discuss the specific uses of ICT technologies and tools to facilitate the search of information. *Limited to the use of the Internet as a search tool using:* *i) search engines;* *ii) on-line libraries (digital libraries, electronic journals, and academic resources).*
	1.3.2 Information security policies	11) Outline the following policies related to information security: i) Remote access; ii) Password creation and management; iii) Portable media (USB devices); iv) Acceptable use of hardware and Internet access.

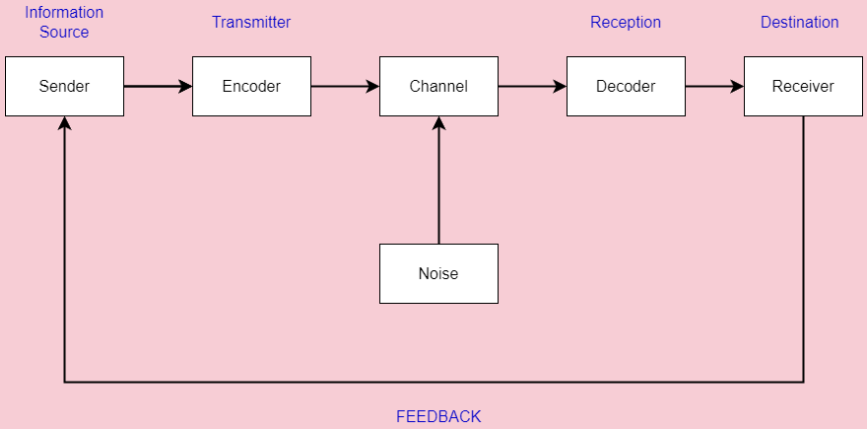
Topic	Sub-Topic	Assessment Criteria
	1.3.3 Data protection legislation through compliance with the General Data Protection Regulation (GDPR)	12) Outline the need for Data Protection and its legislation. 13) Define the main aim of the GDPR. 14) Compare and contrast a data subject and data controller. 15) List the roles of the Data Protection Officer. *Limited to a local (Maltese) context.*
	1.3.4 Backing up data	16) Explain the importance of a backup strategy and the potential risks of not having one. 17) Compare backup types. *Limited to full, differential, and incremental backups.*
	1.3.5 Security of data	18) Justify the importance of data integrity. 19) Distinguish between Authentication and Authorisation. 20) Give examples of authentication technologies. *Limited to:* *i) User ID/Password/PIN codes;* *ii) Access cards (using magnetic or Near Field Communication - NFC);* *iii) Biometrics (fingerprint, face, palm print, voice recognition and retina/iris scanning).* 21) Define n-factor authentication. *In terms of section 1.3.5 (20).* 22) Give examples of the use of n-factor authentication. *Limited to 2-factor authentication.*

Topic	Sub-Topic	Assessment Criteria
		23) Give examples of authorisation. *Limited to:* *i) physical access control;* *ii) access rights management and permissions - no access, read, write, and execute.* 24) Outline the main issues involved in securing data against intentional and unintentional loss. *Limited to:* *i) malicious practices (through use of malware or other illegal practices);* *ii) natural causes (e.g., floods, fires, hardware failure, etc.).* 25) Explain the issue of security vs usability. *With reference to the balancing act between additional security and its impact on users*. 26) Define Cybercrime. 27) Outline the effects that Cybercrime can have on organisations. 28) Distinguish between the following malpractices: i) hacking; ii) phishing; iii) malware; *Limited to spyware, ransomware, and viruses.* iv) Social engineering to manipulate human behaviour; v) Physical eavesdropping and break ins; vi) Skimming. *Technical explanation and details are not required.*

Topic	Sub-Topic	Assessment Criteria
1.4 System Development	1.4.1 Stages of system development	1) Define an algorithm. 2) Define a computer-based system. 3) Give examples of computer-based system types. *Limited to transactional-based systems, real-time systems, and embedded systems.* 4) Draw a flowchart for a given real-world process. 5) Define the main stages of development of computer-based systems. *Limited to:* *i) problem definition;* *ii) feasibility study;* *iii) requirements elicitation;* *iv) analysis and design;* *v) testing;* *vi) implementation;* *vii) maintenance;* *viii) retirement.* 6) Outline *the main aspects involved in the following phases:* i) maintenance; *Limited to perfective, corrective, and adaptive.* ii) testing. *Limited to black box, white box, and beta.*
	1.4.2 Project Management	7) Define project management. *In terms of the impact it may have on the quality of the solution.*

Topic	Sub-Topic	Assessment Criteria
		8) Outline the aspects of project management. *Limited to time and resource management* 9) Outline how development progress is measured and any corrective action which may be required to keep development on track. 10) List the characteristics of an efficient project team. *Limited to any three characteristics.* 11) List the characteristics of an effective project manager. *Limited to any three characteristics.*

Subject Focus:	**ICT in Organisations**
Learning Outcome 2:	**I can understand the different types of technologies, the systems used in organisations, and the different organisational structures.**

Topic	Sub-Topic	Assessment Criteria
2.1 Forms of communication	2.1.1 Introduction to communication	1) Describe the transmission model of communication.  2) Distinguish between the different types of communication: i) voice; ii) written; iii) visual. *To include advantages and disadvantages of each communication.*
	2.1.2 Voice communication	3) Outline the application of the following voice communication methods: i) fixed-line; ii) mobile; iii) VoIP; iv) satellite links.

Topic	Sub-Topic	Assessment Criteria
		4) Outline the technologies used in the voice communication methods listed in section 2.1.2 (3). *Limited to the medium of communication used.*
	2.1.3 Written communication	5) Outline the application of the following written communication methods: i) word processors; ii) e-mail clients; iii) Portable Document Format (PDF); iv) groupware and workflow systems (e.g., Microsoft Teams, Trello). 6) Compare and contrast the methods discussed in section 2.1.3 (5). 7) Give examples of where and why the methods listed in section 2.1.3 (5) are used.
	2.1.4 Visual communication	8) Outline the application of the following visual communication methods: i) digital image processing; ii) scanning; iii) video and presentation platforms; iv) virtual reality; v) augmented reality. 9) Give examples of where and why the methods in section 2.1.4 (8) are used. 10) Define some terms with respect to digital image processing. *Limited to resizing, aspect ratio, compressing images (JPG, GIF, PNG).*

Topic	Sub-Topic	Assessment Criteria
	2.1.5 The internet as a communication medium	11) Describe the following Internet communication tools. i) e-mail; ii) video and audio (streamed and pre-recorded); iii) chatting; iv) forums; v) collaborative tools; vi) web conferencing; vii) blogging; viii) wikis; ix) micro-blogging; x) social networks. 12) Give examples of how each of the communication tools in section 2.1.5 (11) can be used in the context of a business, both in an internal and an external communications context.
2.2 Role of ICT in organisations	2.2.1 Organisational structure	1) Define an organisation. 2) Distinguish between the different structures that would subdivide an organisation by: i) function; ii) product; iii) project.
	2.2.2 E-business	3) Define e-Commerce. *To include mobile e-Commerce.* 4) Define e-Business. 5) Differentiate between e-Commerce and e-Business. 6) List the advantages and disadvantages of e-Commerce for businesses and customers. 7) List the advantages and disadvantages of e-Business for businesses and customers.

Topic	Sub-Topic	Assessment Criteria
		8) Compare and contrast the following models: i) business-to-business (B2B); ii) business-to-consumer (B2C); iii) consumer-to-consumer (C2C). *In terms of their functionality, their application, and examples of platforms used.* 9) Define e-Marketing. 10) Define e-Markets (e.g., eBay). 11) Define a web portal. 12) Give examples of a web portal.
	2.2.3 E-government	13) Define E-government. 14) Outline of the following e-Services: i) admin to admin; *Limited to Inter-departmental data requests.* ii) admin to business; *Limited to e-Procurement.* iii) admin to citizen (e.g., requesting birth certificate). 15) Distinguish between Informational and Transactional e-Services. *Limited to applications and payments.* 16) Give examples of web portal e-Services (such as gov.mt).
	2.2.4 E-learning tools in organisations	17) Define an Electronic Identity. 18) List the uses of Electronic Identity. 19) Define e-learning. 20) Compare and contrast synchronous and asynchronous learning.

Topic	Sub-Topic	Assessment Criteria
		21) Outline the advantages and disadvantages of e-Learning.
	2.2.5 User support systems	22) Define user support systems. 23) Explain why an organisation and external customers may need user support. 24) Outline the use of a help desk and a help desk software. 25) Describe the various types of user support systems. *Limited to:* *i) forums;* *ii) user booklets;* *iii) live-chat & chat-bots;* *iv) FAQs & knowledge bases;* *v) remote support (e.g. Teamviewer).*
	2.2.6 Customer Relationship Management (CRM)	26) Define CRM. 27) Outline the advantages of a CRM. *In terms of sales, marketing and support to select, acquire, retain, and extend the customer-base.*
	2.2.7 ICT tools in organisations relating to Science and Engineering	28) Define the concepts: i) Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM); ii) experimentation and simulation; *Limited to traffic and piloting (air and sea).* iii) navigation, data tracking systems, telemetry; iv) statistical packages (e.g., SPSS).

Topic	Sub-Topic	Assessment Criteria
	2.2.8 Artificial Intelligence (AI)	29) Define AI. 30) Give examples of the use of AI. *Limited to enhancing the performance of solutions in:* *i) entertainment;* *ii) healthcare;* *iii) education;* *iv) transportation networks and vehicles.*
	2.2.9 Big Data	31) Define Big Data. 32) Define the three Vs of Big data (Volume, Velocity, and Variety). 33) Give examples of Big Data in the following areas: i) retail; ii) financial services. 34) Outline advantages and disadvantages in the use of Big Data as outlined in section 2.2.9 (33).
	2.2.10 Sustainable technologies in ICT	35) Define sustainability in terms of ICT. 36) Outline the following domains in terms of ICT sustainability: i) storage techniques; ii) Internet of Things (IoT); 37) Give examples of systems under the domains listed in section 2.2.10 (36). 38) Outline the concepts behind the use of automation to leverage sustainability. *Limited to:* *i) manufacturing;* *ii) transport;* *iii) domestic smartness.*

Topic	Sub-Topic	Assessment Criteria
	2.2.11 Health and safety	39) Explain the following concepts with reference to Health and Safety: i) computer usage techno stress and digital detox; ii) Repetitive Strain Injury (RSI); iii) eyestrain (font and icon sizes, themes, dark and light modes). 40) Give examples of health and safety issues relating to an ICT work environment. *Limited to the following aspects:* *i) monitor positioning;* *ii) seating conditions;* *iii) ergonomic keyboards and mice;* *iv) size of monitor;* *v) ambient lighting;* *vi) climatic conditions;* *vii) ownership of workspace by employees;* *viii) taking regular breaks from the working area.*

Subject Focus:	**Software**
Learning Outcome 3:	**I can understand software (system, online and application), and the use and modelling of data.**

Topic	Sub-Topic	Assessment Criteria
3.1 Aspects and categories of software	3.1.1 Software	1) Define software. 2) Distinguish between open source, free, and proprietary software in terms of software usage and licencing. *Licencing limited to group and individual licencing.* 3) Define the notion of Intellectual Property and the right of owning it.
	3.1.2 System software	4) Define system software. 5) Define the following types of system software: i) operating system; ii) utility applications; *Limited to antivirus, archivers (compression), and file managers.* 6) Recommend a suitable utility application from the list in section 3.1.2 (5) (ii), for a given situation.
	3.1.3 Application software	7) Define application software. 8) Define the types of application software. *Limited to:* *i) specific;* *ii) general purpose (generic);* 9) Compare and contrast the types of application software listed in section 3.1.3 (8).

Topic	Sub-Topic	Assessment Criteria
	3.1.4 Operating System (OS)	10) Define an OS. 11) Define the components of an OS. *Limited to:* *i) kernel (supervisor or control program);* *ii) memory manager;* *iii) input/output manager;* *iv) file system manager;* *v) backing store manager;* *vi) resource allocation and process scheduler.*
	3.1.5 Software properties	12) Define software portability. 13) Justify the need for software portability. 14) Define downward compatibility. 15) Justify the need for downward compatibility. 16) Outline the use of embedding content within the context of objects within documents.
	3.1.6 Software evaluation	17) Define software evaluation criteria, which an organisation or an individual might consider when selecting a software solution. *Limited to:* *i) hardware needs;* *ii) quality of documentation;* *iii) compatibility with existing software (interoperability);* *iv) ease of use of the software;* *v) technical support;* *vi) cost;* *vii) provider reputation.*

Topic	Sub-Topic	Assessment Criteria
3.2 Database systems	3.2.1 Introduction	1) Define a file. 2) Define a database. 3) Describe the importance of databases. *In terms of usability and data organisation.* 4) Define a flat-file database structure. 5) Describe the issues with a flat-file database structure. *Limited to data isolation, data duplication (redundancy), and program/data dependence.* 6) Define a relational database. 7) Compare and contrast relational and flat-file database systems. *Limited to data consistency and integrity, data redundancy, design (structural) complexity, and cost.*
	3.2.2 Centralised and distributed database systems	8) Define centralised and distributed database systems. 9) Draw representations, using simple block diagrams (using blocks and lines only), of the centralised and distributed database structures. 10) Compare and contrast centralised to distributed databases.
	3.2.3 Relational data model	11) Define the following database terms: i) table (relation); ii) entity; iii) field; iv) key field (primary key); v) foreign key; vi) record (tuple); vii) links (relationships).

Topic	Sub-Topic	Assessment Criteria
		12) Describe a given set of tables using the database notation as listed hereunder: i) the name of each table (relation) is followed by a list of all the fields in brackets; ii) key fields are underlined; iii) foreign keys are in italic if printed or over-line if hand-written; iv) entity names in upper case whereas field names are in lower case. 13) Identify the best data types to represent data attributes for a given scenario. *Limited to text, numeric, Boolean and date.*
	3.2.4 DBMS	14) Define a Database Management System (DBMS). 15) Outline the difference between a database and a DBMS. 16) Define a Data Dictionary. 17) Outline the role of the Database Administrator (DBA).
	3.2.5 Entity Relationship Diagrams (ERD) *Crow's Foot notation is to be used.*	18) Outline the use of an Entity Relationship Diagram (ERD). 19) Define cardinality. 20) Define the three cardinalities: i) one-to-one; ii) one-to-many; iii) many-to-many. 21) Give examples of the cardinalities listed in section 3.2.5 (20). *Limited to textual examples.* 22) Interpret an ERD. *Limited to a maximum of four data entities.*

Topic	Sub-Topic	Assessment Criteria
3.3 Internet technologies and applications	3.3.1 Introduction to the Internet	1) Define Domain Names and Internet Protocol (IP) addresses. 2) Outline the function of the Domain Name System in terms of structure, meaning, and translation to IP addresses. 3) Define Internet Service Provider (ISP). 4) Compare and contrast Intranets and Extranets. 5) Define IPv4 as an addressing structure.
	3.3.2 Basics of HTML and CSS	6) Define HTML. 7) Explain the use of the following HTML tags: i) <html> ii) <body> iii) <head> iv) <style> v) <title> vi) <p> vii) <h1>, <h2>, <h3> viii) <a> (internal/external) ix) Lists and x) <table> xi) <img> xii) <nav> xiii) <footer> xiv) <header> xv) <main> xvi) <figure> xvii) xviii) <a> (anchors/mailto) xix) comments in HTML <!-- … --> xx) <meta>

Topic	Sub-Topic	Assessment Criteria
		8) Correct erroneous use of the HTML tags as listed in section 3.3.2 (7) i) to xi). 9) Write HTML code snippets. *Limited to not more than 15 lines of HTML code using tags limited to those listed in section 3.3.2 (7) i) to xi).* 10) Define CSS. 11) Justify the need for external CSS files rather than embedding CSS within HTML. 12) Outline the use of *class* and *ID* in CSS. 13) Give examples of basic CSS uses. *Limited to styles:* *i) color (limited to predefined colour names for plain text);* *ii) text-align (limited to left, right, centre and justify);* *iii) font-family (limited to exercising the knowledge of candidates in setting types of font faces);* *iv) text-decoration (limited to underline, overline and line-through);* *v) font-weight (limited to bold or normal);* *vi) font-style (limited to italic and normal);* *vii) font-size (limited to pixels).* *Limited to formatting using the tags in section 3.3.2 (7) (vi), (vii) and (ix) and styles listed under section 3.3.2 (13).* 14) Correct erroneous use of the CSS selectors as listed in section 3.3.2 (13). 15) Define form validation. *Limited to the context of online forms and limited to client-side validation.* 16) Justify the use of different types of validation on an online form. *Limited to range, presence, format, length, and data type.*

Topic	Sub-Topic	Assessment Criteria
		17) Define sitemaps. 18) Outline the use of sitemaps. 19) Compare and contrast the use of text editors with GUI editors when creating a website.
	3.3.3 World Wide Web (WWW)	20) Define the following: i) WWW; ii) website; iii) web server; iv) web browser. 21) Outline the features of a web browser. *Limited to the address bar, bookmarks, and browsing history.* 22) Explain the use of a Uniform Resource Locator (URL). 23) Identify the various parts of a URL. *Limited to protocol, domain, top level domain (TLD), and file path.*
	3.3.4 Internet protocols	24) Define the following protocols: i) TCP/IP; ii) SMTP; iii) POP and IMAP; iv) FTP and SFTP; v) HTTP and HTTPS.
	3.3.5 Internet client applications	25) Define the following applications: i) email; ii) video conferencing applications.

Topic	Sub-Topic	Assessment Criteria
	3.3.6 Internet security problems	26) Define the following types of Internet-based fraud: i) phishing; ii) password hacking; iii) brute force attacks; iv) DoS attacks; v) social engineering. 27) Define the following types of malware: i) adware ii) spyware; iii) worms; iv) trojans; v) viruses; vi) keyloggers; vii) rootkit; viii) ransomware. 28) Define the following countermeasures to the problems listed in section 3.3.6 (27). i) encryption (private and public); ii) firewalls; iii) antivirus software; iv) digital signatures and certificates.

Scheme of Assessment

IM Information Technology is assessed by means of **TWO** components:

i) Written Paper - 3 hour written paper assessing Subject foci 1, 2, and 3;

ii) Coursework - 1 assignment.

The following table shows the percentage weighting of each component and subsequent sections.

Component	Section	Module	% Weighting
Written Paper (3 hours)	Section A	Subject Focus 1: Information Systems	40
	Section B	Subject Focus 2: ICT in Organisations	16
	Section C	Subject Focus 3: Software	24
Coursework	Assignment: Web Design		20

The examination consists of **ONE** written paper, and **ONE** assignment.

Written Paper

- a written paper of 3 hours duration, marked out of 100, which carries 80% of the total score;
- candidates will write their answers on a separate booklet provided by MATSEC;
- consists of three sections:

Section A: Information Systems

- Questions are set on the syllabus content of subject focus 1 with a maximum mark of 50.
- Four questions are set:
  - one compulsory question, consisting of short questions and carrying 20 marks;
  - three questions, to choose two, each carrying 15 marks.

Section B: ICT in Organisations

- Questions are set on the syllabus content of subject focus 2 with a maximum mark of 20.
- Two questions, to choose one, each carrying 20 marks.

Section C: Software

- Questions are set on the syllabus content of subject focus 3 with a maximum mark of 30.
- Three questions are set:
  - one compulsory question, consisting of short questions and carrying 20 marks;
  - two questions, to choose one, each carrying 10 marks.

Coursework

- The coursework is assessed through **ONE** assignment 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 by not later than the date stipulated by the MATSEC support unit.

- **ONE** compulsory assignment will be set during the course. This assignment deals with Web Design and has a weighting of 20%. Candidates must submit and meet the criteria for a pass, as set by the examiners in the assignment to be able to get a grade between A and E.

- It is up to the tutor to schedule the completion date of the assignment.

- All candidates may be called for an interview on their coursework.

- Candidates may re-submit the assignment as specified in the MATSEC Examination Regulations.

- An authentication form is required and is available for download from the MATSEC website.

Note for Private candidates:

- Private Candidates are to submit the assignment to MATSEC for assessment, by the date stipulated by MATSEC. Candidates may be called for an interview about their work.

- An authentication form is required and is available for download from the MATSEC website.

Grading

- The final grade will be based on an overall aggregate score.

- The candidates have to meet the criteria for a pass, as set by the examiners in all components of the assessment (Paper I and Coursework), to qualify for a Grade A to E.

Re-sit

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

Coursework

No retention of coursework mark from the 2024 session or any other previous session of examinations.

Guidelines

Problems chosen by candidates 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 – textbooks, Internet, other scientific and peer-reviewed resources.

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 coursework are provided within this document (including front-page and document structure).

Software Requirements

For the sake of the documentation, it is recommended that candidates should become conversant with the nature and capabilities of the most common generic reporting and presenting software as required to successfully describe and explain one's work and reasoning.

Thus, the documentation should be presented as a word-processed document that includes all the presentation and layout features as listed in the marking scheme below. Furthermore, the document is to be sectioned and titled as indicated in the marking scheme for readability purposes.

Web Design Coursework

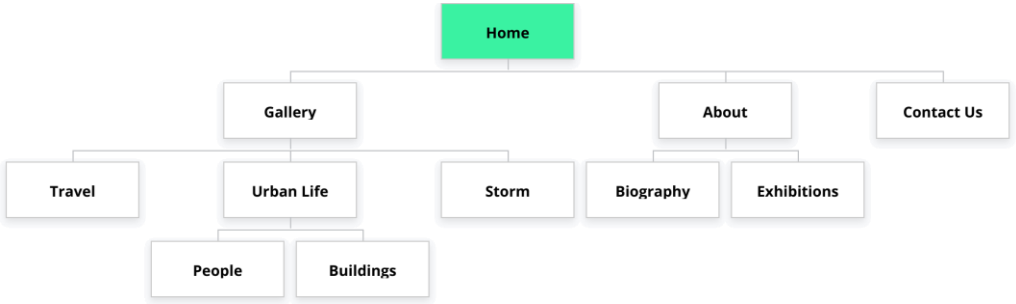
Web Design Coursework

100 marks

The aim of this assignment is to introduce the candidates to Hyper Text Markup Language (HTML) and Cascade Style Sheets (CSS). The candidate should appreciate what goes on "behind the scenes" and is therefore not allowed to make use of any tools which auto-generate HTML or CSS code or make use of premade templates. The candidate's efforts should be aimed at learning how to use HTML tags to generate the content of simple web pages and applying style and presentation through a separate CSS file.

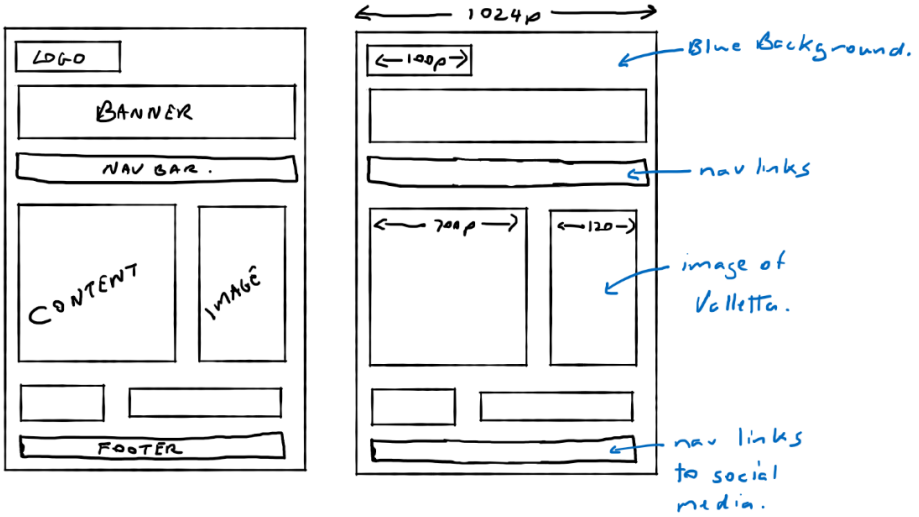
Software Requirements

The choice of a Web development tool must be limited to a text-based editor, e.g., Brackets, or any basic plain text editors, such as Notepad, VI editor, etc. Any tools or services that allow the automatic generation of HTML code, from diagrammatic or other forms, are not to be used.

Section	Details
Webpage Requirements	**Problem definition and background information** The assignment should be thought of as a solution within a context of the candidate's choice, for example, creating a web site for a local restaurant or hair salon. Therefore, in this section, the candidate is expected to provide a description of the context within which the website is to be built. This should include a brief description of any practical problems currently faced by the client which can be solved by a website. **Scope** The candidate is expected to briefly explain the reasons behind the project. **Requirements list** This section is to be used by candidates to outline a top-level description of the requirements. This should include details such as, a list of pages required, colours to be used in the overall design, the contact information to be made available, etc. These details should then form the basis of the website's design, implementation, and testing. **Advantages of the website to the company** In this section, reasons should be given as to why an organisation should go into the expense of paying for the development and maintenance of a website.
Design	**Sitemap** A simple hierarchical diagram depicting all the pages of the site and their organisation is sufficient. For guidance purposes one could use the example shown in figure 1 to get an idea of what is expected in this section.  *Figure 1: Sitemap*

Paper prototype of each page

Paper prototypes should serve as a graphical equivalent to the textual description of each page in order to further clarify the proposed organisation and layout of each page. For guidance purposes one could use the following example to get an idea of what is expected in this section.



Cascading Style Sheet (CSS) elements

The candidates should specify details of font styles, sizes, alignment and colours for the main elements identified in the layouts in the paper prototype. As a minimum, this should include the background colour for the pages as well as details for the <h1>, <h2>, <a>, <nav>, and <footer> elements.

Bandwidth considerations

The candidate should outline reasons for being careful with the inclusion of high-resolution media in a website despite ever growing Internet connection speeds. The candidate should also explain how these considerations are to be implemented by going into some detail with regards to the file formats chosen for images and videos.

Test plans

The scope of this section is to make the candidate aware of the importance of both validation and verification testing. For this reason, the candidate should as a minimum, present the following two types of tests.

Requirements Testing

This type of testing should be seen as a simple checklist whereby it is ensured that all the client requirements as previously extracted, are implemented in the assignment. A guiding example is reproduced in the following table.

Requirement	Completed?
A Google map was included in the Contact Us page.	
The background colour of all the pages is fuchsia.	
The font style used for the <h1> tags is Arial.	
… etc…	

Blackbox testing

The three types of tests expected are:

- Testing of all HTML pages under an HTML validator.
- Testing of all CSS files under a CSS validator.
- Testing that all links work.

All tests should be presented in tabular format as indicated below (the tests included below are meant only to serve as examples).

Test number	Description	Expected Outcome	Actual Outcome
1	The home page's HTML is validated.	No HTML syntax errors are present.	
2	Test mail-to link in the Contact Us page.	Email client opens.	
3	Test embedded map in the Contact Us page.	Embedded map opens.	
…etc…			

Implementation

Candidates are expected to describe the use of the following elements and sub-sections, and to provide a working solution for each.

Use of div tags with class or IDs

The candidate is to appreciate that HTML tags, or even tags within individual divisions, can be customised with their own CSS code. The web pages should be created using multiple divs layered together to form a single page. Formatting for divs and other tags should be done through the use of CSS rules attached to ID and class attributes or the tags themselves. E.g., The candidate might specify "default" CSS code for the <p> tag but then customise a particular <p> tag which is meant to look different from the higher level <p> tags by using an ID or class attribute. Similarly, if the candidate requires the enforcement of a rule for all <p> tags, the rule might be added to all <p> tags directly.

Minimum of five different pages

The candidate should present a minimum of five HTML pages including a "Homepage" and a "Contact Us" page.

Use of title tag for every page

Filling in the <title> tag is required since this text will appear in the title bar and tabs in a browser which helps the user to navigate the website when using multiple windows.

Use of meta tags

The meta tags specified in the marking scheme are to be included in every HTML page such that web crawlers can identify what the website is about.

Use of external style sheet CSS linked to all pages

The candidate is to ensure that all the CSS rules are placed in a CSS file separate from the HTML files. Individual tags which need separate modifications can always be addressed using IDs as mentioned earlier.

Limitations of a "Contact Us" page

The HTML form does not need to implement any Javascript. That is to say that the candidate is not expected to present a working form which can be submitted to a server since the steps involved do not fall within the scope of this assignment.

Use of at least one table throughout the website

The candidate is expected to make use of at least one HTML table where appropriate. E.g., to display a list of products sold by a shop.

Use of Hyperlinks

By internal links it is understood that such links direct the website's user to another page within the same website. Whereas external links direct the user to other websites. Anchors should direct the user to other points within the same web page which is especially useful for web pages with lengthy content. Ideally the mail-to link would be placed within the "Contact Us" page, however other placements should be accepted as long as they fit into the website context chosen by the candidate.

Use of images including alternate text

The candidate should ensure that all images are relevant to the context chosen.

Use of embedded content

The candidate is encouraged to research the Web for the numerous educational materials that give step-by-step instructions on how to include responsive videos and online maps.

Page footer

The candidate is to create at least two social media icons. The candidate is not expected to create the social media pages themselves, but to just create a link to the homepage of the social media website.

Evaluation

Implementation of test plan (and test results)

In this section, the candidate is expected to copy the tables presented in the 'Test Plans' section and fill out the actual results of the test.

Test under HTML validator

The candidate must include at least one screenshot for a webpage as proof that all the webpages were tested.

Test under CSS validator

The candidate must include at least one screenshot proving that the CSS file/s were tested.

Testing of all the web pages in at least two different browsers

As a minimum, a screenshot of the landing page in at least two different browsers.

All links must be functional

All tests should be presented in tabular format as indicated below (the tests included below are meant only to serve as examples).

Test number	Description	Expected Outcome	Actual Outcome
1	Test button Home in page Contact Us	Home page opens	Home page opens
2	Test mail-to link in page Contact Us	Email client opens	Email client opens
3	Test google map in page Contact Us	Google map opens	Google map opens
… etc …			

Proper folder structure is to be used

All website files must be located within the same folder. However, any images and downloadable resources should be paced in appropriately named separate subfolders.

Works without horizontal scrolling

Content in each page must fit a screen width of 1024 pixels resolution in order to avoid any horizontal scrolling.

Images are not resized using HTML

Resizing of images must not be done through HTML or CSS code, but must be done beforehand using an image editor.

Legibility

The colour scheme used throughout the site should be consistent. The proposed site should be readable. Readability refers to having sufficient contrast between the foreground colour and background colour such that the text content can be easily read.

System evaluation

The candidate is expected to show that the requirements set have been met.

Future enhancements

This should include any possible improvements which, given more time, and experience, could have been included in the assignment.

Skills acquired

A brief description of the skills learned by the candidate in relation to web design and development should be included.

Overall presentation and layout of documentation

All the listed items must be included in word-processed format. The candidate is encouraged to take advantage of the features available in most word processing programs to create an orderly table of contents including page numbers and an APA-style bibliography. A bibliography is taken to be a set of resources that have been overviewed to gain insight into the domain of the assignment.

In the header or footer, a candidate should include his name, surname, and government I.D. card number (or equivalent identity document), and the school's name (if applicable). A page number, in Arabic form, should be included to the far right of the footer.

It is suggested that font sizes of the main text should be 12pt for body text, 16pt for main headings, and 14pt for sub-heading. Font styles should be either Arial or Calibri. The Courier New font type should be used for any code snippets.

Line spacing should be 1.5. All tables, diagrams, and screenshots must be properly captioned and the caption reference should be used within the text to indicate which table, diagram, or screenshot is being referred to.

Marking Criteria: Web Design Project

MARKING CRITERIA – Web Design Project *Any text editor or web authoring tool may be used, however content management systems (CMSs) cannot be used.*	**Marks**
Web Page Requirements (12 marks)	
Problem Definition and background information [200 to 300 words]	3
Scope (what you will be tackling in the project) [100 to 200 words]	2
Requirements list	4
Advantages of the website to the company [200-300 words)	3
Design (20 marks)	
Site-map (Organigram)	4
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 pages to go by the following structure: • header; • navigation bar; • content; • footer.	6
Bandwidth considerations	3
Test Plans, limited to: • black box testing for: functional validity, visual tests in terms of resizing issues and resolution, and cross-browser compatibility; • requirements coverage.	4 3
Implementation (40 marks) *Candidates are expected to describe the use of the following elements and sub-sections, and to provide a working solution for each.*	
Use of div tags with class or IDs	5
Minimum of five different pages (including a Homepage and Contact us page)	5
Use of title tag for every page	1
Use of meta tags (limited to author, keywords, charset, and description)	2
Use of an external style sheet (CSS) linked to all pages	3
Use of a "Contact Us" page with a form containing at least the following: • name and surname fields; • email field; • comments field; • submit button; • reset/clear button.	 1 1 1 1 1
Use of at least one table throughout the website	3
Use of Hyperlinks (minimum of one of each type must be used): • internal; • external; • anchor; • mail-to.	 1 1 2 2
Use of images including alternate text (minimum of five images throughout the website are to be used)	3
Use of embedded content: • online map; • video.	 2 2
Page footer to include: • copyright notice (i.e., © Joe Borg YYYY); • at least two functional social media icons.	 1 2
Evaluation (28 marks)	
Implementation of test plan (and test results)	5
Test under HTML validator: http://validator.w3.org (100% validation is not required)	2
Test under CSS validator: http://jigsaw.w3.org/css-validator (in the form of a screenshot)	2
Testing of all the web pages in at least two different browsers	3
All links must be functional	4
Proper folder structure is to be used (e.g. images in different folder than pages)	2
Works without horizontal scrolling	1
Images are not resized using HTML, but properly resized using a photo editor	1
Legibility (contrast between text and background, text size and font considerations)	1
System evaluation (what was implemented vs. scope of project)	2
Future enhancements	1
Skills acquired	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.	3
Total:	**100**