St Maarten Academy Year Plan

CAPE Computer Science Unit 2

Sept 2023 – May 2024

Please note that a Spiral Approach will be used

Term 1

Week	Topic	Objectives/Sub-Objectives	Assessment
1	MODULE 1: DATA STRUCTURES	describe the concept of abstract data types (ADTs); *The fundamental characteristics of ADTs:* *Initialize elements of the data structure, add an* *element, remove an element and find an* *element.* *Data type: primitive and non-primitive; Data* *structures: linear and non-linear.* *To include: Stacks, Queues, Circular Queues and* *Singly linked lists.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz
2	MODULE 1: DATA STRUCTURES	distinguish among ADTs; Stacks (LIFO), queues (FIFO) - *inclusive of* *Circular queues,* singly linked list (INSERT and DELETE): definition, structure and operation.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
3	MODULE 1: DATA STRUCTURES	perform basic operations on standard ADTs using diagrams and algorithms; Stacks: Push, Pop, Empty, Full. Queues, *Circular queues*: Enqueue, Dequeue, *Empty, Full.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet

4	MODULE 1: DATA STRUCTURES	implement basic ADTs using one dimensional arrays; Write programs to implement Stacks, Queues, *and Circular queues*.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
5	MODULE 1: DATA STRUCTURES	*implement sorting and searching* algorithms using one-dimensional arrays. Linear search; binary search; simple selection sort; bubble sort.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
5	MODULE 2: SOFTWARE ENGINEERING	explain the reasons for a structured approach to the software development process; *Reasons for a structured approach to the software development process:* Increased dependence of many organisations on their computer systems.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Outline	Discussion of Potential IA Projects	Selection and development of IA Research Topic
6	MODULE 2: SOFTWARE ENGINEERING	explain the reasons for a structured approach to the software development process; Crises in previous developments: for example, increasing costs of software development; dissatisfaction of users and management with the quality and suitability of software; increasing length and complexity of the software.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
6	MODULE 2: SOFTWARE ENGINEERING	explain the reasons for a structured approach to the software development process; Requirements for standard interfaces, both to	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet

		users and to other software. Need for tighter control and management of process; visibility of the process; risk management. Importance of the need for the involvement of end users and management.	
7	MODULE 2: SOFTWARE ENGINEERING	explain the attributes of a well-engineered software product; *Attributes* of a well-engineered software: maintainability; dependability; efficiency; usability; portability; availability of appropriate documentation *(system and user documentation).* *End of Module Quiz*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Module Quiz
7	MODULE 2: SOFTWARE ENGINEERING	*examine the strengths and weaknesses of different generic software process models;* *Phases of the Software Development Life Cycle.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
8	MODULE 2: SOFTWARE ENGINEERING	*examine the strengths and weaknesses of different generic software process models;* *Life Cycle Models: waterfall; evolutionary development including rapid prototyping; reuse oriented; agile.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
8	MODULE 2: SOFTWARE ENGINEERING	*examine the strengths and weaknesses of different generic software process models;* *Strengths and weaknesses of different generic software process models.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Outline	Discussion of Potential IA Projects	Selection and development of IA Research Topic

9	MODULE 2: SOFTWARE ENGINEERING	*outline* the main activities, tools, techniques and deliverables of the analysis phase; *Requirements and Specification Process:* *feasibility study; requirements analysis.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
9	MODULE 2: SOFTWARE ENGINEERING	*outline* the main activities, tools, techniques and deliverables of the analysis phase; *Tools and Techniques: Interviews, questionnaires, observations, review internal* *documents, prototyping, Data Flow Models* *(Data Flow Diagrams) and their use to document* *the flow of information: use of symbols to depict* *data stores, process, data flows and external* *entities; Data Dictionaries.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
10	MODULE 2: SOFTWARE ENGINEERING	*outline* the main activities, tools, techniques and deliverables of the analysis phase; *Computer Aided Software Engineering (CASE)* *tools.* *Deliverables: requirements specification* *(feasibility report, functional and non-functional* *specification).*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
10	MODULE 2: SOFTWARE ENGINEERING	*apply relevant tools and techniques to create the deliverables of the design phase;* *Design process: architectural design; interface* *design; data structure design; algorithm design.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet

11	MODULE 2: SOFTWARE ENGINEERING	*apply relevant tools and techniques to create the deliverables of the design phase;* *Tools and techniques: Structure charts, CASE tools, Semantic Data Models (Entity-Relationship Diagrams)*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
11	MODULE 2: SOFTWARE ENGINEERING	*apply relevant tools and techniques to create the deliverables of the design phase;* Design Methods: top-down, bottom-up, system structuring (sub-systems, modules, programs); Design Strategies: functional versus object oriented.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Development	Development of Potential IA Projects	Selection and development of IA Research Topic
12	MODULE 2: SOFTWARE ENGINEERING	*apply relevant tools and techniques to create the deliverables of the design phase;* Guidelines for screens, reports, user interfaces. Deliverables: system architecture, design specification.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
12	MODULE 2: SOFTWARE ENGINEERING	*outline the main activities, tools, techniques and deliverables of the implementation phase;* *Coding process.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Development	Development of Potential IA Projects	Selection and development of IA Research Topic
13	MODULE 2: SOFTWARE ENGINEERING	*outline the main activities, tools, techniques and deliverables of the validation phase;*	Practical Assessment Case Study/Research Project/Practical

		Need for the testing process, test plans; software inspection; software testing (unit inspection, test case design, and system testing);	Assessment/Online Quiz/Tutorial Sheet
13	MODULE 2: SOFTWARE ENGINEERING	*outline the main activities, tools, techniques and deliverables of the validation phase;* *user testing (alpha, beta, and acceptance); Blackbox and Whitebox testing.* End of Module 2 Quiz	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Module 2 Quiz
	Internal Assessment - IA-SBA Data Collection	Data Collection of Potential IA Projects	Selection and data procedures development of IA Research Topic
14	End of Semester Exam		
14	End of Semester Exam		

Term 2 Jan – April 2024

Week	Topic	Objectives/Sub-Objectives	Assessment
1	MODULE 2: SOFTWARE ENGINEERING	*outline the main activities, tools, techniques and deliverables of the evolution phase; and* *Need for maintenance; Fault repairs, environmental adaptation, Functionality addition.* *Types of maintenance.* *Documentation review.* *Regression Testing.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
2	MODULE 2: SOFTWARE ENGINEERING	*examine issues confronting modern computer systems, societies and users.* *Intellectual Property (types of software license:* *Shareware and Freeware; piracy), privacy,* *Data Protection.* *Computer Misuse.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
2	MODULE 2: SOFTWARE ENGINEERING	*examine issues confronting modern computer systems, societies and users.* *Threats (viruses, worms, distributed denial of* *service attacks, malware, ransomware, hacking)* *and countermeasures.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Data Collection	Data Collection of Potential IA Projects	Selection and data procedures development of IA Research Topic
3	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*explain the concept of an operating system;* *Definition.* *Purpose of operating systems:* *Resource management – memory, I/O,*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet

		processor; interface.	
3	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* how operating systems have evolved over time from primitive batch systems to sophisticated multi-user systems; *History of operating system development.* *Batch processing.* *Real time systems.* *Multi programming (including interactive multiprogramming).* *Multi-processing.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
4	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; Operating system functions: Bootstrap process. Process Management: Definition.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
4	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; Process states: Running, Ready, Blocked. How the interrupt mechanism works. Deadlock *and Deadlock resolution.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
5	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; The process control block (process descriptor) Scheduling Algorithms Pre-emptive (Shortest- Job-First (SJF), round robin) and Non-preemptive (First Come First Serve (FCFS), Shortest-Job- First (SJF)).	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
	Internal Assessment - IA-SBA Data Analysis	Data Analysis of Potential IA Project	Selection and data analysis and presentation of IA Research Topic
5	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems;	Practical Assessment

		Memory Management. *Virtual Memory, paging, thrashing.*	Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
6	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; *File Management:* *Directories/Folders, Files, file compression.* *End of Module 2 Exam*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Module 2 Exam
6	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; *Security (of files).* *User IDs, Passwords, Lockwords, Access control* *list, file encryption, Activity logs.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
7	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; *Interface (user):* *Types of interfaces: command prompt, menu,* *GUI and the manipulation of the interface*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
7	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*describe* the functions of operating systems; *Device Management.* *Device drivers.* *Interrupt handling (PCB).* *Input/output control.* *Peripheral control, Polling, Buffering, Spooling.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
8	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; *Networking:* *Network management (user accounts, access* *logs) Networking Protocols (TCP/IP).*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
8	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed;	Practical Assessment

		Network Architecture: Ethernet, FDDI.	Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
9	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Network topology: Star, Ring, Bus, Hybrid.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
9	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Network devices: Modems, switches, routers, bridges, network interface cards (NIC), hubs.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
10	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Transmission Media: wired (twisted pair, fiberoptics, coaxial); wireless (satellite, microwave, Bluetooth, infrared, Wi-Fi and WiMAX).	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
10	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Protocol: Transmission Control Protocol/Internet Protocol (TCP/IP), File Transfer Protocol (FTP), Hypertext.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
10	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Transfer Protocol (HTTP); Hypertext Transfer Protocol Secure Sockets Layer (HTTPS);	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Practical Assessment

		IEEE802.11a/b; IEEE802.16g; *characteristics of* *Voice Over Internet Protocol;* *Open System Interconnection (OSI)* *model.*	Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
11	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Networking consideration: cost, security, management, expandability, interconnectivity, wired vs wireless	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
11	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	distinguish among networked, client-server, and distributed; Network Configuration: Types: Multi-user; client server, centralised vs. distributed system, peer to peer. Network Security: Firewalls.	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
11	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*draw diagrams to represent* *connections between the* *components of simple networks*; *and,* *Components of simple networks* *(may include* *routers, ISPs, switches, modems,* *microcomputers, mobile devices,* *wireless access* *points, servers, hubs, network* *attached storage* *[NAS]).* *End of Module 3 Exam*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet Module 3 Exam
12	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*draw diagrams to represent* *connections between the* *components of simple networks*; *and,* *Use of diagrams to design networks.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet

12	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*explore data strategies for large scale systems.*	Practical Assessment
			Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
		Flat file storage, Relational databases; *Platforms to include (MYSQL, SQL Server);* *Review of IA First Draft*	
	IA Write Up First Draft Due		Corrections on IA First draft
12	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*explore data strategies for large scale systems.*	Practical Assessment
			Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
		Primary keys, secondary keys, foreign keys, and *candidate keys.*	
13	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*explore data strategies for large scale systems.*	Practical Assessment
			Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
		Simple SQL statements (SELECT, INSERT, JOIN *(inner join only) UPDATE, DELETE);*	
13	MODULE 3: OPERATING SYSTEMS AND COMPUTER NETWORKS	*explore data strategies for large scale systems.* *Query Strings and Stored Procedures; and,* *Database connections and Web services.*	Practical Assessment Case Study/Research Project/Practical Assessment/Online Quiz/Tutorial Sheet
14	Mock Exam Collection of IA Final Draft	*CAPE Mock Exam April 2024* *Collection of IA Final Draft*	Mock Exam IA Collection