



COURSE OUTLINE
COMPUTER SCIENCE – GENERAL YEAR 12: 2021
UNIT 3 AND UNIT 4



This course will run the two units, 3 and 4, concurrently. The student Semester 1 grade will therefore be an estimate.

Term and Week	Topic and key teaching points	Syllabus content	Assessments
Term 1 Week 1	Project management Types of system development methodologies	Introduction <ul style="list-style-type: none"> • introduction to the course • assessment requirements • expectations Systems analysis and development - Knowledge <ul style="list-style-type: none"> • the concept of project management, including: <ul style="list-style-type: none"> ▪ planning ▪ scheduling ▪ budgeting ▪ tracking • types of system development methodologies <ul style="list-style-type: none"> ▪ prototyping ▪ system development life cycle (SDLC) 	
Term 1 Week 2	Stages of the SDLC Hardware and software Storage capacities	Systems analysis and development - Knowledge <ul style="list-style-type: none"> • stages of the SDLC <ul style="list-style-type: none"> ▪ preliminary analysis ▪ analysis ▪ design ▪ development ▪ implementation ▪ evaluation and maintenance • computer system hardware and software • storage capacities, including: <ul style="list-style-type: none"> ▪ bit ▪ byte ▪ kilobyte ▪ megabyte ▪ gigabyte ▪ terabyte 	

<p align="center">Term 1 Week 3-4</p>	<p>Boot process</p> <p>Hardware components for a computer system</p> <p>Fetch-execute cycle</p> <p>Components of the CPU</p> <p>Standard operating environments</p>	<p>Systems analysis and development - Knowledge</p> <ul style="list-style-type: none"> • the concept of boot process • appropriate hardware components for a computer system designed for a specific purpose, including: <ul style="list-style-type: none"> ▪ input ▪ output ▪ processing ▪ storage (primary and secondary) • the concept of the fetch-execute cycle • functions of the components of the central processing unit (CPU) <ul style="list-style-type: none"> ▪ arithmetic logic unit (ALU) ▪ control unit (CU) ▪ registers ▪ program counter ▪ system clock • the role of the standard operating environment (SOE) 	<p>Task 1: Project – Analyse an existing system and recommend hardware/software 12% (Term 1 Weeks 3-6)</p> <p>Task 2: Theory test – Systems analysis and development 4% (Term 1 Week 6)</p>
<p align="center">Term 1 Week 5-6</p>	<p>Systems development documentation</p> <p>Ethics</p> <p>Privacy and etiquette</p> <p>Troubleshooting strategies</p>	<p>Systems analysis and development - Knowledge</p> <ul style="list-style-type: none"> • systems development documentation as a part of the SDLC <ul style="list-style-type: none"> ▪ context diagrams using Yourdon/Demarco notation <p>Systems analysis and development - Skills</p> <ul style="list-style-type: none"> • analyse context diagrams • document an existing system • create context diagrams using Yourdon/Demarco notation, as a part of the SDLC <p>Systems analysis and development - Knowledge</p> <ul style="list-style-type: none"> • the purpose of an ICT code of conduct • ethics in the development and use of ICT systems • privacy considerations in the development and use of ICT systems • digital communications etiquette when using ICT systems • troubleshooting strategies, including: <ul style="list-style-type: none"> ▪ diagnosis of fault ▪ implement a solution ▪ document troubleshoot procedure • appropriate physical preventative maintenance measures 	

<p align="center">Term 1 Week 7-8</p>	<p>Spreadsheet terms</p> <p>Creating spreadsheets</p>	<p>Managing data - Knowledge</p> <ul style="list-style-type: none"> • spreadsheet terms, including: <ul style="list-style-type: none"> ▪ cell ▪ formula ▪ function (sum, average, max, min, count, countif) ▪ label ▪ worksheet ▪ lookup tables (hlookup, vlookup) <p>Managing data - Skills</p> <ul style="list-style-type: none"> • create solutions using a spreadsheet application using: <ul style="list-style-type: none"> ▪ functions ▪ charts ▪ lookup functions ▪ sorting 	<p>Task 3: Practical test – Managing data: Spreadsheets 4% (Term 1 Week 8)</p>
<p align="center">Term 1 Week 9</p> <p align="center">Term 2 Week 1-5</p>	<p>Data structure, types and terms</p> <p>Data protection methods</p> <p>Database design and documentation</p> <p>Ethical and legal issues</p> <p>Create a database</p>	<p>Managing data - Knowledge</p> <ul style="list-style-type: none"> • hierarchical structure of data <ul style="list-style-type: none"> ▪ character/byte ▪ field ▪ record ▪ table/relation • data types, including: <ul style="list-style-type: none"> ▪ number ▪ date/time ▪ currency ▪ text (string) ▪ Boolean (true/false) • database terms, including: <ul style="list-style-type: none"> ▪ data, field and record ▪ data integrity ▪ data redundancy • data protection methods, including: <ul style="list-style-type: none"> ▪ encryption ▪ authentication <ul style="list-style-type: none"> ○ passwords 	<p>Task 4: Project – Create a single table database upon a case study 13% (Term 2 Weeks 1-5)</p> <p>Task 5: Theory test – Managing data 4% (Term 2 Week 1)</p> <p>Task 6: Practical test – Managing data: Databases 4% (Term 2 Week 5)</p>

		<ul style="list-style-type: none"> ○ biometric ○ digital signature ● design considerations for visual interfaces and navigation systems within database systems ● the purpose of database documentation for the user ● ethical and legal issues relating to the personal use and storage of data ● legal requirements and implication of information kept by various organisations about individuals ● issues related to use of online databases <p>Managing data - Skills</p> <ul style="list-style-type: none"> ● create a working single table database which includes: <ul style="list-style-type: none"> ▪ data types ▪ primary keys ▪ forms ▪ reports ▪ queries ● create a visual interface for users of a database ● create database documentation 	
Term 2 Week 3	Task 7: External Set task (SCSA) 15%		
Term 2 Week 6-7	<p>Operating systems and utility software</p> <p>Software licensing</p>	<p>Developing software - Knowledge</p> <ul style="list-style-type: none"> ● purpose and function of software to operate a computer system <ul style="list-style-type: none"> ▪ operating systems ▪ utility software, including: <ul style="list-style-type: none"> ○ file compression ○ defragmenter ○ anti-virus ○ anti-malware ▪ application software ● requirements for software licensing, including: <ul style="list-style-type: none"> ▪ freeware ▪ open source ▪ shareware 	



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UNIT 3 AND UNIT 4



Term 2 Week 8-9	<p>Software development cycles</p> <p>Software development factors</p>	<p>Developing software - Knowledge</p> <ul style="list-style-type: none"> • stages of the software development cycle (SDC) <ul style="list-style-type: none"> ▪ state the problem ▪ plan and design ▪ develop the solution ▪ test the solution ▪ evaluate the solution • factors affecting the development of software, including: <ul style="list-style-type: none"> ▪ user needs ▪ user interface 	<p>Task 8: Theory test – Developing software 4% (Term 2 Week 9)</p>
Term 2 Week 10-11 Term 3 Week 1-5	<p>Programming data types</p> <p>Variable naming conventions</p> <p>Control structures</p> <p>Types of code</p> <p>Programming errors</p> <p>Data validation</p> <p>Pseudocode and flow charts</p> <p>Create a digital solution</p>	<p>Programming - Knowledge</p> <ul style="list-style-type: none"> • characteristics of data types, including: <ul style="list-style-type: none"> ▪ integer ▪ real (floating point number) ▪ Boolean ▪ character • naming conventions for variables • types of control structures, including: <ul style="list-style-type: none"> ▪ sequence ▪ selection <ul style="list-style-type: none"> ○ one-way (if then) ○ two-way (if then else) ○ multi-way (nested if) ▪ iteration <ul style="list-style-type: none"> ○ test first (while) ○ test last (repeat until) ○ fixed (for) • types of code, including: <ul style="list-style-type: none"> ▪ source ▪ executable • types of program or code errors, including: <ul style="list-style-type: none"> ▪ syntax errors ▪ run-time errors ▪ logical errors 	<p>Task 9: Project – Create a computer program 15% (Term 2 Weeks 10-11, Term 3 Weeks 1-5)</p> <p>Task 10: Theory test – Programming 4% (Term 3 Week 3)</p> <p>Task 11: Practical test – Programming 7% (Term 3 Week 4)</p>



COURSE OUTLINE
COMPUTER SCIENCE – GENERAL YEAR 12: 2021
UNIT 3 AND UNIT 4



- the concept of data validation, including:
 - test data
 - trace table
 - modelling of an algorithm to test for logic using flow charts
- Programming - Skills**
- use pseudocode to represent a programming solution
 - create flow charts to represent a programming solution
 - apply, using pseudocode and a programming language, the following programming concepts:
 - constants
 - variables
 - apply, using pseudocode and a programming language, the following control structures:
 - sequence
 - selection
 - iteration
 - apply, using pseudocode and a programming language, the following techniques:
 - develop internal and external documentation
 - select and apply suitable test data for checking the solution
 - use trace tables to test for and debug logic errors
- Developing software - Skills**
- apply software development requirements, including:
 - user needs
 - user interface
 - apply the SDC to create a digital solution

<p>Term 3 Week 6-9</p>	<p>Types of networks</p> <p>Communication terms</p> <p>Transmission media</p> <p>Hardware components</p> <p>Protocols</p> <p>Network security</p> <p>Types of malware</p> <p>Create network diagrams</p>	<p>Networks and communications - Knowledge</p> <ul style="list-style-type: none"> • types of communication networks <ul style="list-style-type: none"> ▪ personal area network (PAN) ▪ local area network (LAN) ▪ wide area network (WAN) • star network topology • diagrammatic representation of network topologies for PAN, LAN and WAN • technologies appropriate for the implementation of a client/server and peer-to-peer network • communication terms, including: <ul style="list-style-type: none"> ▪ protocols ▪ digital ▪ analogue ▪ ethernet • characteristics of transmission media, including: <ul style="list-style-type: none"> ▪ twisted pair ▪ fibre optic ▪ satellite ▪ cellular ▪ wireless • functions of the following computer hardware components required for networks <ul style="list-style-type: none"> ▪ router ▪ switch ▪ firewall ▪ modem ▪ network interface card (NIC) ▪ wireless access point ▪ bridge • types of communication protocols, including: <ul style="list-style-type: none"> ▪ post office protocol 3 (POP3) ▪ internet message access protocol (IMAP) ▪ simple mail transfer protocol (SMTP) ▪ wireless access protocol (WAP) • methods used to ensure security of information over the internet, including: <ul style="list-style-type: none"> ▪ authentication 	<p>Task 12: Project – Design a LAN for a household 10% (Term 3 Weeks 6-9)</p> <p>Task 13: Theory test – Networks and communications 4% (Term 3 Week 8)</p>
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		<ul style="list-style-type: none">▪ encryption▪ firewalls• types of malware, including:<ul style="list-style-type: none">▪ viruses▪ worms▪ trojans▪ spyware <p>Networks and communications - Skills</p> <ul style="list-style-type: none">• create network diagrams using CISCO network diagram conventions to represent network topologies for PAN and LAN	
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