# COURSE OUTLINE
# COMPUTER SCIENCE – GENERAL YEAR 12: 2022
# 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<br><br>Types of system development methodologies | **Introduction**<br>• introduction to the course<br>• assessment requirements<br>• expectations<br>**Systems analysis and development - Knowledge**<br>• the concept of project management, including:<br>  ▪ planning<br>  ▪ scheduling<br>  ▪ budgeting<br>  ▪ tracking<br>• types of system development methodologies<br>  ▪ prototyping<br>  ▪ system development life cycle (SDLC) | |
| **Term 1 Week 2** | Stages of the SDLC<br><br>Hardware and software<br><br>Storage capacities | **Systems analysis and development - Knowledge**<br>• stages of the SDLC<br>  ▪ preliminary analysis<br>  ▪ analysis<br>  ▪ design<br>  ▪ development<br>  ▪ implementation<br>  ▪ evaluation and maintenance<br>• computer system hardware and software<br>• storage capacities, including:<br>  ▪ bit<br>  ▪ byte<br>  ▪ kilobyte<br>  ▪ megabyte<br>  ▪ gigabyte<br>  ▪ terabyte | |

# COURSE OUTLINE
# COMPUTER SCIENCE – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| **Term 1 Week 3-4** | Boot process<br><br>Hardware components for a computer system<br><br>Fetch-execute cycle<br><br>Components of the CPU<br><br>Standard operating environments | **Systems analysis and development - Knowledge**<br>• the concept of boot process<br>• appropriate hardware components for a computer system designed for a specific purpose, including:<br>  ▪ input<br>  ▪ output<br>  ▪ processing<br>  ▪ storage (primary and secondary)<br>• the concept of the fetch-execute cycle<br>• functions of the components of the central processing unit (CPU)<br>  ▪ arithmetic logic unit (ALU)<br>  ▪ control unit (CU)<br>  ▪ registers<br>  ▪ program counter<br>  ▪ system clock<br>• the role of the standard operating environment (SOE) | **Task 1:** Project – Analyse an existing system and recommend hardware/software 10% (Term 1 Weeks 3-6)<br><br>**Task 2:** Theory test – Systems analysis and development 5% (Term 1 Week 6) |
| **Term 1 Week 5-6** | Systems development documentation<br><br>Ethics<br><br>Privacy and etiquette<br><br>Troubleshooting strategies | **Systems analysis and development - Knowledge**<br>• systems development documentation as a part of the SDLC<br>  ▪ context diagrams using Yourdon/Demarco notation<br><br>**Systems analysis and development - Skills**<br>• analyse context diagrams<br>• document an existing system<br>• create context diagrams using Yourdon/Demarco notation, as a part of the SDLC<br><br>**Systems analysis and development - Knowledge**<br>• the purpose of an ICT code of conduct<br>• ethics in the development and use of ICT systems<br>• privacy considerations in the development and use of ICT systems<br>• digital communications etiquette when using ICT systems<br>• troubleshooting strategies, including:<br>  ▪ diagnosis of fault<br>  ▪ implement a solution<br>  ▪ document troubleshoot procedure<br>• appropriate physical preventative maintenance measures | |

# COURSE OUTLINE
# COMPUTER SCIENCE – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| **Term 1**<br>**Week 7-8** | Spreadsheet terms<br><br>Creating spreadsheets | **Managing data - Knowledge**<br>• spreadsheet terms, including:<br>▪ cell<br>▪ formula<br>▪ function (sum, average, max, min, count, countif)<br>▪ label<br>▪ worksheet<br>▪ lookup tables (hlookup, vlookup)<br><br>**Managing data - Skills**<br>• create solutions using a spreadsheet application using:<br>▪ functions<br>▪ charts<br>▪ lookup functions<br>▪ sorting | **Task 3:** Practical test – Managing data: Spreadsheets 5% (Term 1 Week 8) |
| **Term 1**<br>**Week 9-10**<br><br>**Term 2**<br>**Week 1-4** | Data structure, types and terms<br><br>Data protection methods<br><br>Database design and documentation<br><br>Ethical and legal issues<br><br>Create a database | **Managing data - Knowledge**<br>• hierarchical structure of data<br>▪ character/byte<br>▪ field<br>▪ record<br>▪ table/relation<br>• data types, including:<br>▪ number<br>▪ date/time<br>▪ currency<br>▪ text (string)<br>▪ Boolean (true/false)<br>• database terms, including:<br>▪ data, field and record<br>▪ data integrity<br>▪ data redundancy<br>• data protection methods, including:<br>▪ encryption<br>▪ authentication<br>○ passwords | **Task 4:** Project – Create a single table database upon a case study 12% (Term 1 Week 10, Term 2 Weeks 1-4)<br><br>**Task 5:** Theory test – Managing data 5% (Term 1 Week 10)<br><br>**Task 6:** Practical test – Managing data: Databases 5% (Term 2 Week 1) |

| | | | |
|---|---|---|---|
| | | ○ biometric<br>○ digital signature<br>• design considerations for visual interfaces and navigation systems within database systems<br>• the purpose of database documentation for the user<br>• ethical and legal issues relating to the personal use and storage of data<br>• legal requirements and implication of information kept by various organisations about individuals<br>• issues related to use of online databases<br>**Managing data - Skills**<br>• create a working single table database which includes:<br>▪ data types<br>▪ primary keys<br>▪ forms<br>▪ reports<br>▪ queries<br>• create a visual interface for users of a database<br>• create database documentation | |
| **Term 2 Week 3** | **Task 7:** External Set task (SCSA) 15% | | |
| **Term 2 Week 6-7** | Operating systems and utility software<br><br>Software licensing | **Developing software - Knowledge**<br>• purpose and function of software to operate a computer system<br>▪ operating systems<br>▪ utility software, including:<br>○ file compression<br>○ defragmenter<br>○ anti-virus<br>○ anti-malware<br>▪ application software<br>• requirements for software licensing, including:<br>▪ freeware<br>▪ open source<br>▪ shareware | |

# COURSE OUTLINE
# COMPUTER SCIENCE – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| **Term 2 Week 7** | Software development cycles<br><br>Software development factors | **Developing software - Knowledge**<br>• stages of the software development cycle (SDC)<br>  ▪ state the problem<br>  ▪ plan and design<br>  ▪ develop the solution<br>  ▪ test the solution<br>  ▪ evaluate the solution<br>• factors affecting the development of software, including:<br>  ▪ user needs<br>  ▪ user interface | |
| **Term 2 Week 8-10**<br><br>**Term 3 Week 1-5** | Programming data types<br><br>Variable naming conventions<br><br>Control structures<br><br>Types of code<br><br>Programming errors<br><br>Data validation<br><br>Pseudocode and flow charts<br><br>Create a digital solution | **Programming - Knowledge**<br>• characteristics of data types, including:<br>  ▪ integer<br>  ▪ real (floating point number)<br>  ▪ Boolean<br>  ▪ character<br>• naming conventions for variables<br>• types of control structures, including:<br>  ▪ sequence<br>  ▪ selection<br>  ○ one-way (if then)<br>  ○ two-way (if then else)<br>  ○ multi-way (nested if)<br>  ▪ iteration<br>  ○ test first (while)<br>  ○ test last (repeat until)<br>  ○ fixed (for)<br>• types of code, including:<br>  ▪ source<br>  ▪ executable<br>• types of program or code errors, including:<br>  ▪ syntax errors<br>  ▪ run-time errors<br>  ▪ logical errors | **Task 8:** Project – Create a computer program 18%<br>(Term 2 Weeks 8-10, Term 3 Weeks 1-5)<br><br>**Task 9:** Theory test – Programming 5%<br>(Term 3 Week 3)<br><br>**Task 10:** Practical test – Programming 5%<br>(Term 3 Week 4) |

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

# COURSE OUTLINE
# COMPUTER SCIENCE – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| **Term 3**<br>**Week 6-9** | Types of networks<br><br>Communication terms<br><br>Transmission media<br><br>Hardware components<br><br>Protocols<br><br>Network security<br><br>Types of malware<br><br>Create network diagrams | **Networks and communications - Knowledge**<br>• types of communication networks<br>  ▪ personal area network (PAN)<br>  ▪ local area network (LAN)<br>  ▪ wide area network (WAN)<br>• star network topology<br>• diagrammatic representation of network topologies for PAN, LAN and WAN<br>• technologies appropriate for the implementation of a client/server and peer-to-peer network<br>• communication terms, including:<br>  ▪ protocols<br>  ▪ digital<br>  ▪ analogue<br>  ▪ ethernet<br>• characteristics of transmission media, including:<br>  ▪ twisted pair<br>  ▪ fibre optic<br>  ▪ satellite<br>  ▪ cellular<br>  ▪ wireless<br>• functions of the following computer hardware components required for networks<br>  ▪ router<br>  ▪ switch<br>  ▪ firewall<br>  ▪ modem<br>  ▪ network interface card (NIC)<br>  ▪ wireless access point<br>  ▪ bridge<br>• types of communication protocols, including:<br>  ▪ post office protocol 3 (POP3)<br>  ▪ internet message access protocol (IMAP)<br>  ▪ simple mail transfer protocol (SMTP)<br>  ▪ wireless access protocol (WAP)<br>• methods used to ensure security of information over the internet, including:<br>  ▪ authentication | **Task 11:** Project – Design a LAN for a household 10% (Term 3 Weeks 6-9)<br><br>**Task 12:** Theory test – Networks and communications 5% (Term 3 Week 8) |

| | | | |
|---|---|---|---|
| | | ▪ encryption<br>▪ firewalls<br>• types of malware, including:<br>▪ viruses<br>▪ worms<br>▪ trojans<br>▪ spyware<br><br>**Networks and communications - Skills**<br>• create network diagrams using CISCO network diagram conventions to represent network topologies for PAN and LAN | |