SKILLS PROGRAMME DOCUMENT						
Skills Programme Title	**Java Programmer**					
NQF Level	4	Credits	53	Duration in days		68
Skills Programme ID	SP- 220329					
Skills Programme Status	Approved			Start Date	End Date	
				11/03/2022	11/03/2027	
Last date for enrolment	11/03/2028	Last date for achievement	11/03/2031			

SKILLS PROGRAMME DETAILS

1.	**Title**	Java Programmer
2.	**Sub Title**	OFO Title: Software developer OFO Code: 251201
3.	**NQF Level:**	4
4.	**Duration**	13.5 weeks/68 days
5.	**Credits**	53
6.	**Quality Assuring Body**	Quality Council for Trades and Occupations (QCTO)
7.	**Skills Programme Rationale**	Realising the importance and future impact of the Fourth Industrial Revolution (4IR) on the economy of South Africa and its competitiveness, the Minister of Communications gazetted the Presidential Commission on the Fourth Industrial Revolution (PC4IR) on 9 April 2019. By March 2020 this Commission delivered a report with wide ranging recommendations for Human Capital Development that will drive the 4IR forward. It clearly indicated the speed at which companies will have to invest in big data analysis, web-enabled market investment and the use of cloud computing and machine learning. Software development is central to these initiatives. Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks. The software developer is the important cog in designing advanced computerised technologies. South Africa has a scarcity of software developers and there is a clear need for a qualification focusing specifically on the training and education of software developers. No similar skills programmes that have been approved by the QCTO. There is an abundance of international research that points to the phenomenal growth in the need for qualified software developers, including Java Programmers, since Java is a very popular programming language that has a number of application possibilities, e.g., mobile applications, artificial intelligence, web design, etc. For example, according to the US Bureau of Labour Statistics (BLS), demand for software developers is projected to grow by 22% by 2029. To put that figure in perspective, the average annual projected growth rate across all occupations is about 4%. In South Africa, according to the 2020 list of occupations in high demand: Technical Report (Department of Higher Education and Training) published in 2021 it is clear that the role of the Software Developer and its derived skills programmes have been identified as pivotal by several Sector Education and Training Bodies (SETAs) as well as being in critical need by industry and academia alike. With so much job growth on the horizon, prospective Java Programmers stand to see a bright future ahead of them. Those with proper training and education not only have great job security and a range of options but a high-paying, rewarding career path. Responding to the rapid skills

		demand by supplying software developers will thus have a positive impact on the economy. It is also important to note that there are great opportunities to become self-employed and the entrepreneurial orientated software developers will form new companies (with the employment creation associated with it). In a 2019 OFFERZEN report on a survey of software developers, 39.5% indicated that within 5 years they want to establish their own companies. This growth in new companies in an environment where digitisation is becoming more and more important, will have a positive impact on society, not only in terms of connectivity, ICT savvy, communications and the like, but also, as a new industry, the creation of jobs. It should be noted that the Information Technology and Computing industry is highly competitive and each vendor has its own certification exam. Typically, prospective candidates for the exams will enrol for a vendor specific short course prior to the exam. These certifications are globally recognised within the ICT industry. Within this context it is important to note that this qualification was developed vendor agnostic, thereby preparing the learner for and allowing the learner to enter any of the vendor specific certifications. This is a huge step forward toward inclusivity within the ICT industry of South Africa. Typical learners include school leavers and persons who want to enter the ICT sector with programming skills. Minimum requirements are a Gr 11 with Mathematics Literacy and English. No formal registration is required to function as a Java Programmer. However, international certification programmes are available and it will be to the benefit of the learner to achieve theses certifications. Java Programmers can be employed in any economic sector, e.g., finance, insurance, healthcare, energy, environment, government, transport, agriculture and food.
8.	**Related registered qualification/s**	• OCC: Artificial Intelligence Software Developer, NQF Level 5, 209 Credits (ID 118792) • OCC: Cloud Administrator, NQF Level 4, 149 Credits (ID 118699) • OCC: Cybersecurity Analyst, NQF Level 5, 173 Credits (ID 118986) • OCC: Data Science Practitioner, NQF Level 5, 185 Credits (ID 118708) • OCC: Internet-of-Things Developer, NQF Level 4, 141 Credits (ID 119262) • OCC: Robotic Processing Automation (RPA) Developer, NQF Level 5, 185 Credits (ID 119242) • OCC: Quality Test Automator, NQF Level 5, 179 Credits (ID 118789) • OCC: Software Developer, NQF Level 5, 220 Credits (ID 118707)
9.	**Purpose**	A Java Programmer will be able to implement solutions to solve real-life problems in an efficient manner, applying a knowledge and

		understanding of the principles of programming with Java and applicable tools. Tasks that the learner will be able to know, do and understand after achievement of the skills programme include: • Create well-written and readable Java programs, using a disciplined coding style, including documentation and indentation standards. • Use Git functionalities for working collaboratively in a team and execute version control.	
10.	**Content**	**<u>Knowledge component</u>** • 900102-000-00-KM-01, Introduction to Java Programming, NQF Level 4, Credits 2 • 900102-000-00-KM-02, Principles of Programming with Java, NQF Level 4, Credits 6 • 900102-000-00-KM-03, Principles of Object Orientated Programming with Java, NQF Level 4, Credits 4 • 900102-000-00-KM-04, Principles of Intermediate Programming with Java, NQF Level 4, Credits 6 • 900102-000-00-KM-05, REST API and Modularization, NQF Level 4, Credits 2 Total credits: 20	**<u>Application component</u>** • 900102-000-00-PM-01, Getting started with Java, NQF Level 4, Credits 3 • 900102-000-00-PM-02, Programming with Java, NQF Level 4, Credits 8 • 900102-000-00-PM-03, Object Orientated Programming with Java, NQF Level 4, Credits 4 • 900102-000-00-PM-04, Intermediate Programming with Java, NQF Level 4, Credits 6 • 900102-000-00-PM-05, Getting started with REST API and Modularization, NQF Level 4, Credits 4 • 900102-000-00-PM-06, Keystone project with Java, NQF Level 4, Credits 8 Total credits: 33
11.	**Minimum entry requirements**	• Grade 11 with Maths Lit and English. • Access to equipment, internet connectivity and how to work remotely	
12.	**Exit Level Outcomes (ELO) and Associated Assessment Criteria (AAC)**	**Exit Level Outcomes (ELO) 1** Describe the basics of Java Programming **Associated Assessment Criteria (AACs)** • The fundamentals of the Java programming language are explained. • The basic concepts and methods of object-oriented programming and object-oriented design are described. • The development life-cycle as a means of creating applications is described.	

		Exit Level Outcomes (ELO) 2 Programme effectively using Java frameworks and functionalities **Associated Assessment Criteria (AACs)** • Java syntax is demonstrated, using the Java API. • Well-written and readable Java programs are created, using a disciplined coding style, including documentation and indentation standards. • Problems with application development are addressed by troubleshooting. **Exit Level Outcomes (ELO) 3** Work collaboratively in a team using GitHub platform **Associated Assessment Criteria (AACs)** • An ability to work with GitHub is demonstrated. • Working in a team collaboratively is achieved by using GitHub. • Version control is exercised using GitHub. functionalities such as repositories, branches, commits and pull requests.
13.	**Continuous Assessment & Final Integrated Supervised Assessment (FISA)**	**Continuous Assessment** The SDP must ensure that all learners are enrolled with the QCTO at the start of training (within 5 days) in the format required by the QCTO. Continuous assessments are set by the SDP in accordance with the outcomes provided. This may consist of a variety of methods, e.g. practical or written assessments, assignments, projects, demonstrations, presentations or any other form of assessment to assist the learner in the learning process. During training, it is mandatory for formal summative assessments to take place at the end of each module/topic. These results must be formally recorded, and be available for monitoring and/or evaluation by the QCTO. **Final Integrated Supervised Assessment (FISA)** All learners gain entrance to the Final Integrated Supervised Assessment by successfully completing all formal summative assessments conducted by the SDP. Format of FISA: A practical assessment integrating the relevant Exit Level outcomes, with simultaneous verbal assessment of embedded knowledge by the assessor before, during or after the FISA. All FISAs must be supervised, and virtual FISAs must be recorded throughout the assessment. All Exit Level Outcomes must be covered in the FISA. In the FISA, the learner must demonstrate applied knowledge and skills to prove that the competencies of the Skills Programme have been achieved. The FISA may not contain any assessments used in the "Continuous Assessment" process (thus no re-assessment).

		Special considerations should be made for candidates with special learning needs. **Standards for Final Integrated Supervised Assessment (FISA):** The learner should be provided with a brief/job card/task to demonstrate what the learner should show, know or produce in a product, relevant to the Exit Level Outcomes. This is the section where the learner must show applied competency (what the learner must be able to do, and to what expected standard) The FISA INSTRUMENT (Written case study, scenario or brief/task [similar to a job card]) must be developed and moderated by the SDP and conducted in a supervised environment. It is assessed by means of a RUBRIC developed by the SDP for this purpose: A candidate must demonstrate that they are competent at using appropriate toolkit, accessing programming building blocks and work within a repository and create a well-written and readable Java programme. The candidate must be given access to internet connection, applicable software and hardware as well as a **simulated** platform or lab environment with applicable toolkit and virtual machines with access to sufficient information. Candidates must be provided with a scenario or customer brief related to the company for writing a programme at beginner's level and must be able: 1. Create a well-written and readable Java program, using a disciplined coding style, including documentation and indentation standards. 2. Use Git functionalities for working collaboratively in a team and execute version control. The maximum time for the above is 6 hours. Pass mark is 75%. Whilst conducting the above, strategic, well-timed questions should be asked of the learner to assess embedded knowledge gained during the skills programme, as well as critical thinking and problem-solving skills: for e.g. • "Why.....?" • "What would happen if …?" • "When ….. is done, what would the result be?" • "How would you deal with …..?" • Etc. The marking rubric/compliance checklist used to assess these competencies must include a section for the assessor/facilitator used in this session to make a note of competencies shown, (or not shown), as well as the questions that were asked, and a summary of the learner's answers, and state whether these are of the acceptable standard or not. The marking rubric/compliance checklist compiled should contain specific areas marked with an asterisk (*) as compulsory sections in order for the

		learner to be declared C (Competent). Compulsory sections are when the safety of the candidate or others would be affected if incorrectly completed. **Submission of final results** Final results must be submitted to the QCTO in the required format, within 21 days of the date of the FISA, together with the following: • Completed QA Verification Report on the FISA (QCTO template: relevant sections). • A copy of the final Assessment Instrument used, as well as the marking guideline / rubric.
14.	**Recognition of Prior Learning**	• Learners will gain access to the skills programme through RPL for access as provided for in the QCTO RPL Policy. RPL for access is conducted by accredited education institution, skills development provider or workplace accredited to offer that specific skills programme. • Learners who have acquired competencies in skills programme will be credited for such topics through RPL. • RPL for access to the Final Supervised Assessment: Accredited providers and approved workplaces must apply the internal assessment criteria specified in the skills programme document to establish and confirm prior learning and achievement of required competencies for the skills programme.
15.	**Work Opportunities/further learning**	Employment opportunities: • Self-employed, • Working remotely, • Any industry, • Programming companies. Further learning opportunities: • Artificial Intelligence Software Developer • Cloud Administrator • Cybersecurity Analyst • Data Science Practitioner • Internet-of-Things Developer • Robotic Processing Automation (RPA) Developer • Quality Test Automator • Software Developer
16.	**Skills Development Provider Accreditation Requirements**	**Knowledge Modules** *Physical Requirements:* • The provider must have lesson plans and structured learning material or provide learners with access to structured learning

		material that addresses all the topics in all the knowledge modules as well as the applied knowledge in the application.
		• QCTO/ MICT SETA requirements
		Human Resource Requirements:
		• Lecturer/learner ratio of 1:20 (Maximum)
		• Qualification of lecturer (SME):
		  o NQF 5 qualified in industry recognised qualifications with 1-year experience in the IT industry
		  o Cybersecurity vendor certification
		• Assessors and moderators: accredited by the MICT SETA
		Legal Requirements:
		• Legal (product) licences to use the software for learning and training
		• OHS compliance certificate
		Application Modules
		Physical Requirements:
		• Valid licenses software and application, including OS.
		• Internet connection and hardware availability.
		• Examples and information specified in the scope statement and all the case studies, scenarios and access to hardware and software implied in the scope statements of the modules.
		• Remote learners: Provider must provide business IT simulation system (e.g. invoice processing).
		Human Resource Requirements:
		• Qualification of lecturer (SME):
		  o NQF 5 industry recognised qualification with 1 year relevant experience
		• Assessors and moderators: accredited by the MICT SETA
		Legal Requirements:
		• Legal (product) licences to use the software for learning and training
		• OHS compliance certificate
		• Ethical clearance (where necessary)

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