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# [South African Computer Science Guidance](http://zacs.co.za/)

Hints on how to become a skilled Developer

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## [Extending our reach](http://zacs.co.za/2016/10/31/extending-our-reach/)

Now that some of you have started studying this course seriously, there are some ideas that I would like to share with you…

Firstly, building on our initial success in Nemato, we are extending this offer of free training to anyone in South Africa!  Anyone who has access to a PC connected to the Internet can do this course and learn to make money by writing programs for corporate Clients and small and medium sized businesses!

We have noticed that some of the students are already taking on work for Clients, even though they are not yet halfway through the course.  There is nothing stopping you from working for paying Clients, but remember that you will be building a reputation at a stage when you are not yet very skilled.  Your first Clients will remember that and will tell other potential Clients that “you are not very good”!  Is that the reputation you want to build?  Rather focus on your course, and earn better money once you have the necessary training.

We have added a new article in our “Links” menu that tells us about the jobs of the future and what skills you will need to get those jobs – enjoy!

Remember to send an email to [zacomputerscience@googlegroups.com](mailto:zacomputerscience@googlegroups.com) if you have any questions or need some help.

Posted on

## [Start your Computer Science studies now!](http://zacs.co.za/2016/08/07/start-your-computer-science-studies-now/)

Learning about computers involves more than just learning to use social media and a few products like a spreadsheet or word processor.  With a little training, you can write programs that companies will pay for.  When you combine that with a little knowledge of Computer Science, you can charge a premium for your work.

There are excellent University courses available in South Africa that will give you a formal qualification, but that will cost a fair bit of money and at least three years.  The courses that we recommend (see our “Links” page) are a useful introduction to Computer Science and programming and could take you around fifteen weeks.

You can get started right now by finding a PC that is connected to the Internet and registering for the free courses that we recommend under “Training”.  You can find some places that offer computer access under our “Resources” page.

Don’t delay!  Start today.

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# About

About 77% of young people between 18 and 25 in Port Alfred, Eastern Cape, South Africa, are unemployed.  No matter how well they do at school, the local economy is unable to provide meaningful jobs.

Tourism is the art of getting people from elsewhere to pay money into the local economy.  We would like to provide training for local people that will enable them to earn money from other geographic locations.  The Internet enables the speedy delivery of services to anywhere in the world.

The Master Plan is:

1. Teach unemployed people Computer Science and Programming
2. Find them meaningful work on the Internet
3. Build computer systems for remote clients, many of whom will be in other countries
4. Use part of the generated funds to train more people and empower schools.

This plan can be replicated anywhere where Internet access is available.

To achieve this in the Eastern Cape in South Africa, we plan to use the Robert Veenstra Computer Centre (Stenden unit) in Nemato computer room (publicly available PCs) to access Massive Online Open-source Courses (MOOC) like:

* the Harvard University CS50x course “An Introduction to Computer Science and the Art of Programming”, delivered via EDx.org
* Kahn Academy courses
* Code.org and others

All courses are free of charge, students will study in their own time, and successful candidates will have valuable skills.

Initially, successful candidates will compete for work on several “jobbing sites” e.g. www.fiverr.com .  
Once we have a team of around ten successful developers (i.e. they have completed the course and made money on the jobbing sites) we will form a company to market our software development skills and contract the developers to do the work. Skills that are not available locally will be contracted in the local South African market.  Around 12% of the income generated by our contractors will be retained to train more developers and to empower schools to encourage introductory levels of Computer Science and promote the study of Mathematics.

There are about a dozen very good South African Universities which offer degree courses in Computer Science.  Unfortunately, these courses are not free, and unemployed people cannot afford them.  The courses that we recommend are free, they give a very useful introduction to Computer Science and programming, and impart enough skills for students to enter the workforce as competent developers.  If you want to graduate with a Computer Science degree, then you should register at a local university.

But if you want to enter the online job market in the next 15 weeks, our recommended courses are for you!

# Training

* Find a PC that is connected to the Internet – check our “Resources” page for ideas.
* Make sure that you have a valid email address and know how to use it.  Get a free email address on GMail ([https://mail.google.com)](https://mail.google.com/) if you need to.  If you have a problem creating a new email address, please discuss it with your friends or speak to John Mabote at the Stenden computer centre.
* Register on our [email newsgroup](https://groups.google.com/forum/" \l "!forum/zacomputerscience) so that you can see what problems others are having, with solutions, and post your own messages.
* Get a notebook or exercise book and note down the URL, User ID (email address), and password that you use to register on the site.  Add important notes to the book – it is easier to find your notes than to go through a whole video lecture again.
* Visit edx.org and register.  Browse through some of the available courses to get a feel for what is being offered.
* Find the “CS50x” course (“An Introduction to Computer Science and the Art of Programming”) and register.
* View the introductory video to get a feel for what the course is about.  Then open the Syllabus and start working through it.  It is divided into “weeks” – make sure that you complete each week before you go on to the next.  Your assignments will be marked within a week of you submitting the work.
* If you have difficulty, chat to fellow students via the email newsgroup, check our “FAQ” page, and if you are really stuck, contact Rob at webmaster@zacs.co.za
* When you have finished the course, send an email to webmaster@zacs.co.za with a screen image of your assignment marks.  You will then be shown how to earn money on the Internet.
* Note that you can take any other free online courses that you like, but if you want help finding programming work with our team, you need to finish CS50x successfully.
* Good luck!

# Resources

If you need to find a PC that is connected to the Internet, look around at schools, churches, and Universities – they sometimes allow members of the public to use their resources.

Avoid using “Internet Cafe” PCs because they can be quite expensive.

Some government buildings and libraries are offering free Wi-Fi.

* Robert Veenstra Computer Centre (Stenden unit) in Nemato in Port Alfred – they have PCs that the public can use.

# FAQ and Glossary

Frequently Asked Questions

1. What is meant by “Registering” on a website? – Creating a UserName and password for the site. Registered members have access to more content than unregistered people who are just browsing.
2. Where do I start? – Go to the Training link and do as it says.
3. If I am really stuck and don’t know what to do, who do I call? – Contact Rob at webmaster@zacs.co.za

Glossary of words

Acronym – an abbreviation formed from the initial letters of other words and pronounced as a word (e.g. PT = Physical Training)  
Algorithms – a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.  
Application, or App – A program that runs on a computer, tablet, or phone to perform certain standard work, like handle email, or monitor how far you walk each day.  
Assembler – A low level computer language close to machine language.  
Binary – a numbering scheme in which there are only two possible values for each digit: 0 and 1. While we use “Decimal” for numbers (0,1,2,3,4,5,6,7,8,9) computers usually use “Binary” (0,1). We can represent the same integers in both number systems.  
Boston – a city on the Eastern coast of the USA in the state (province) of Massachusetts. Harvard University and MIT are both in Boston.  
C, C++, C#, Objective-C – C is a low level computer language. There are dialects (slightly different versions) of C like C++, C#, and others.  
Characterises – Shows details about  
Cite – Make reference to, or quote  
Collaboration – working with another student or mentor  
Compile – Use a computer program to translate source code into machine language.  
Constraints – rules  
Construct – to build, or something that has been built  
CS50 – A course presented by Harvard University called “An Introduction to Computer Science and the Art of Programming”.  
CS50x – A free version of CS50 that can be studied on the Internet for no cost.  
CSS – Cascading Style Sheets. Used to change the format of a web page.  
Daresay – Maybe even…  
Database – A file system used for storing large amounts of data.  
Decompiling, deobfuscating, or dissassembling – These words mean taking the secret work of the lecturer or his staff and using computer tools to make the work readable by humans.  
Elucidate – make (something) clear; explain  
Enlisting – Asking for  
Executed – Generally means “started” e.g. “He executed the program”.  
Explicitly – Clearly  
Facilitate mastery – make it easier to learn a lot about something.  
Feel free to… – You should now…  
Forge ahead – Move forward.  
Freshman – A university student in her/his first year of study.  
Harvard – A famous university in Boston, USA.  
Hexadecimal – A number system that uses 16 digits (0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f).  
Incidentally – By the way  
Inexhaustively – Not showing every possible example.  
Infer – To work out by reasoning instead of being told.  
Inspiration – a sudden brilliant or timely idea.  
Integrate into – Make something that you have copied a part of your own work.  
Interpolation – Interpolation is an estimation of a value within two known values in a sequence of values.  
Itching – If you a re “itching to do something” you mean that you are keen to do it.  
Leverage – using a tool (a lever) to get something done.  
MIT – Massachusetts Institute of Technology – a University in Boston, USA  
Modifying – Changing e.g. “modifying a program” means “changing a program”.  
Number system – A numeral system (or system of numeration) is a writing system for expressing numbers; that is, a mathematical notation for representing numbers of a given set, using digits or other symbols in a consistent manner.  
Obfuscate – Changing a source program so that a human cannot understand it.  
Odds are – This is likely…  
Office hours – A time and place where a student can consult a tutor or lecturer about her/his particular problem  
Overall – Complete.  
Paradigm – a typical example or pattern of something; a pattern or model.  
Peruse – Read and understand.  
Philosophy – the study of the fundamental nature of knowledge, or a standard approach to a particular branch of knowledge.  
PHP – A computer language based on C but with powerful functions that are useful in developing Web Applications.  
Procrastinate – Leaving things until later when you should do them now.  
Program – a set of instructions to be executed by a computer.  
Programme – a planned series of future events, like the lectures and problem sets in CS50  
Pseudocode – A series of instructions that a computer cannot understand but a human can understand.  
Recognizes – understands  
Resources – sources of information  
Rest assured – to be certain that something will happen  
Rhetorical questions – Questions that make you think, but which do not require an answer.  
Rules of thumb – generally accepted rules  
Scratch – A training computer language created by a team at MIT.  
Snippets – A few lines (generally of program source code)  
Solicit – Ask for  
Sophomore – A second-year university or high-school student  
Source code – Instructions to be executed by a computer that are still in a form that humans can understand.  
Syntax – The set of rules, principles, and processes that govern the structure of sentences in a given language, specifically word order.  
SQL – Structured Query Language. A language used for accessing a database.  
Template – A document or file having a preset format, used as a starting point for a particular application so that the format does not have to be recreated each time it is used.  
Thereto – Reviewing past semesters’ quizzes and solutions thereto (solutions to the quizzes).  
Try not to fret – Don’t be particularly worried about…  
Underneath the hood – In USA, the “hood” is the bonnet of a car. So “underneath the hood” means looking at the engine and other hidden parts to see how it works.  
University – A place of learning and research for studying advanced subjects  
USA – United States of America.  
Virtual – Something that appears to be there but is not real. Not physically existing as such but made by software to appear to do so.  
Waters unfamiliar… – You are in a situation that is unfamiliar to you, that you have no experience of.  
Wave my hand at… – Ignore the detail for now…  
Web Browser – A program (or App) that fetches information from a server computer and displays it on the screen of a computer or phone.  
Web Server – A program that responds to requests for information and delivers the information across a network.  
World Wide Web (www) – a part of the Internet where information can be shared and linked to using mouse-clicks.

# Links

The following study links may be useful:

* [Code.org](https://code.org/) – Anyone can learn to program
* [EDx.org](http://edx.org/) – An education portal with many excellent courses.
* [CS50.harvard.edu](http://cs50.harvard.edu/) – the CS50 course at Harvard
* [Kahn Academy](http://www.khanacademy.org/) – Various courses, including programming

Articles:

* [Micro-jobbing](http://www.bdlive.co.za/opinion/2016/08/08/micro-jobbing-and-young-graduates-are-a-perfect-fit)
* [Jobs of the future and skills you need](https://www.weforum.org/agenda/2016/09/jobs-of-future-and-skills-you-need)

Micro-Jobbing sites

* [Fiverr: The Marketplace for micro-jobbing](https://www.fiverr.com/)
* [Money4Jam Micro-jobbing site](https://site.m4jam.com/)

# South Africa continues to face an IT talent crisis at every level

From MyPR.co.za By [Mari Badenhorst](http://mypr.co.za/author/mari-badenhorst/) Filed Under: [Education](http://mypr.co.za/category/education/)

## ASUS pushes for improved IT skills development

Information and communications technology (ICT) skills in South Africa continue to be scarce both in the retail and distribution arena as well as at the corporate level, which faces what research organisation Gartner calls a global “talent crisis” of immense proportions.

“In retail and distribution, with a specific focus on consumers, there are simply not enough skilled people with the technical savvy to understand the differences in the latest technology that companies like ASUS provides,” says Werner Joubert, Product Country Head (ACZA). “The challenge is that while the average consumer doesn’t have the knowledge to understand these technologies, unfortunately most sales staff aren’t necessarily sufficiently educated either. We obviously don’t want consumers to purchase products they don’t need, or the wrong product for the wrong job.”

But it is at corporate level where there is a real skills crisis at almost every ICT level, which has a dire effect on South African businesses.

“According to the 2016 JCSE ICT Skills Survey — released in July — back in 2010, 45 percent of respondents reported the skills shortage was negatively impacting their businesses,” said Joubert. “In the following four years, the figure remained steady at around 60 to 66 percent. But in 2016, the gap jumped again with 71 percent of businesses stating at least a major effect, while as much as 29 percent say it is a threat to their viability.”

## SA as a destination of choice

Joubert added that in 2015, industry insiders were reporting that South Africa needed between 30 000 and 70 000 skilled IT workers.

“This year, the ICT Skills Survey found this shortage so considerable that the percentage of corporates recruiting overseas has more than doubled, from only 12 percent in 2014 to 26 percent this year.”

Interestingly, the survey found that of the few respondents who did specify their sources preferred African countries, while previous source countries had been India or those situated in Eastern Europe.

“According to the JCSE, South Africa remains a destination of choice for ICT practitioners, as exemplified by what it says is a steady stream of applications for ‘critical skills visas’,” he added. “But looking inside South Africa, it is disturbing that the survey argues we cannot afford to continue relying on an education system that isn’t creating a new generation of young people who are not only knowledgeable about technology and its application in daily life, but who are also interested in developing and implementing ICTs and who are work-ready once they leave the education system.”

## Routes to career success

How, then, to move into or further your career in the ICT arena? The Media, Information, and Communications Technologies (MICT) Sector Education and Training authority’s Skills List 2015/2016 points to a great many avenues into IT; from bachelor degrees to diplomas, national certificates, learnerships, and apprenticeships to international certifications from the likes of Cisco, Microsoft, Oracle, and CompTIA.  
The JCSE survey found that pre hiring qualifications and certifications this year has changed significantly from previous years, with internationally recognised standards replacing graduate degrees and industry association certificates moving into third place.

While vendor certificates are still the least-rated in the recruiting process, they are highly-prized as indicators of ability to support specific products or technologies during the course of employment.  
As for training, little has changed in the past few years Employers still prefer onsite training to offsite, with knowledge sharing with peers follows self-study (discs/ videos/books and e-Learning) as the top scores onsite.

The JCSE says it is “pleased” to note that more than half of all CIOs surveyed in South Africa say they have an active IT internship or apprenticeship programme in their organisations.

Offsite, academic institutions are just ahead of vendors and commercial training companies as the venue or supplier of choice, but there is little to choose between these results.

## Top occupations in demand

For those with the drive to move into IT, there’s good news. IT skills feature high on the South African government’s “National Scarce Skills List: Top 100 Occupations in Demand”, which cites a scarcity of such diverse occupations as ICT systems analysts, software developers, ICT project managers, computer network technicians and network analysts.

And while it is true that a great many companies tend to use service providers to fill IT skills gaps, forward-looking organisations are creating career paths for emerging disciplines such as cloud, analytics and data science, says Gartner.

“More specifically, the 2016 JCSE ICT Skills Survey found that big data design and analytics are high on any corporate’s most-wanted skills list both now and in the future, but that people to fill these posts will be very scarce, which it describes as worrying,” Joubert added.

“There’s also a big gap in supply and demand in infrastructure design/management, process management and information security, with the latter outranking all others, as many companies are increasingly concerned about security.”

Demand continues to be high for database management systems skills, followed by customised and bespoke software.

The JCSE also found very little growth over the past four years in the animation and mobile and gaming categories there has been little growth in the past four years.

## Demand by sector

The JCSE Survey places banking as one of the top sectors on the hunt for rare skills, which include:

* Digital designers
* Systems engineers (process engineers, systems architects, IT system developers)
* Forensic/fraud/security specialists
* Business analysts
* Digital forensic analysts and investigators
* Mobile and digital specialist
* Systems integrator/systems architecture

According to the Banking Sector Skills Plan 2013-201, entrants into the banking market must understand technology and the shift in the way of doing[business](http://buype.co.za/) in the sector. As a result of technology, most scarce skills are not directly related to banking. These include computer programmers, process engineers and generally people in the ICT industry. This paradigm shift to a digital dispensation requires the following set of skills: sales staff that understands technology and relationship management and process engineers that understand controls should possess banking experience and customer relations skills.

In the education sector, the JCSE reports that besides the normal skills required in other sectors, schools and universities are looking for maths, physical science and ICT teachers, lecturers and training specialists.

Accountancy is another sector experiencing a skills shortage in fields other than finance, says the JCSE. Scarce skills are much like those of the banking sector, with continued increasing demand for ICT systems analysts, software developers, programmer analysts, developer programmers, applications programmers, and database designers and administrators.

Safety and security is one of the fastest growing sectors in the ICT arena, and here there are a number of glamorous-sounding occupations in short supply, including cyber-crime investigators and incident response management, likely the fastest-growing segment in this sector.

Candidates with cloud security skills are most in demand but also most challenging to find. According to a report from Skyhigh Networks and the Cloud Security Alliance (CSA), to resolve the skills shortage in the security sector, 37 percent of businesses believe that hiring junior IT professionals and investing in training is the most effective way.

Finally, in the South African retail arena, 2016 JCSE ICT Skills Survey found high demand for e commerce planners, e-commerce managers, web integrators, e-retail managers, and e-retail assistant.

# Contact

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