

**GUIDELINES FOR THE MINIMUM CORE COURSES FOR REGISTRATION IN THE CATEGORY:  
SURVEYOR TECHNICIAN**

	<b>Knowledge Area</b>	<b>Outcome</b>	<b>Topic / Themes</b>	<b>Credits</b>	<b>%</b>
1	<b>Mathematics, Applied Mathematics, and statistics</b>	Ability to apply mathematics and statistics in solving surveying problems at a technician level	Trigonometric functions; co-ordinate geometry; analytical geometry; Matrix algebra, vectors; Calculus: differentiation; partial differentiation; first order differential equations; integration. Statistics: error theory, regression, distributions, correlation, sampling.	<b>36</b>	<b>15</b>
2	<b>Physics</b>	Understanding of the principles of physics in geomatics practice, instrumentation and technology at a technician level	Newton's laws of motion, work, energy, power, rotational dynamics, torque, angular momentum, gravitation, periodic motion, diffraction, refraction and reflection of waves, Doppler effect, electromagnetic field, electricity and magnetism, electromagnetic spectrum, Optics	<b>12</b>	<b>5</b>
3	<b>Surveying</b>	Competency in positioning as required at a technician level	Theory and Principles of Surveying and engineering surveying; Maps and Plans; Units of measure; Coordinate systems and transformation; survey instruments and their use and adjustment; distance and angle measurement: traversing; intersection, resection; trilateration; triangulation of simple triangle configurations ; GNSS; levelling, setting out of pre-calculated positions and heights; Topographic surveying and creation of maps/plans; Area and Volume determination; cut and fill, masshaul diagram, gradients; curves.	<b>54</b>	<b>23</b>
4	<b>Information Technology</b>	Ability to apply Information technology in solving surveying related problems	Introduction to principles of GIS; Data sources, data models, databases, spatial analysis, metadata; spatial interpolation, contours and Digital Terrain Models. applications of geo-spatial data, data analysis, visualisation and representation of geo-spatial information (including digital cartography)	<b>18</b>	<b>8</b>
5	<b>Geographic Information Systems (GIS)</b>	Ability to apply Geo Spatial Information Systems (GIS) in solving survey related problems	Introduction to principles of GIS; Data sources, data models, databases, spatial analysis, metadata; spatial interpolation, contours and Digital Terrain Models. Meta data	<b>18</b>	<b>8</b>
6	<b>Photogrammetry and Remote Sensing</b>	Understanding of theory, principles and application of photogrammetry at a technician level	Electro-magnetic energy in remote sensing, sensor systems (airborne, spaceborne and terrestrial), acquisition of images (including flight planning), principles of analogue and digital photogrammetry, Ground Control.	<b>18</b>	<b>8</b>
7	<b>Coordinate Systems and Map Projections</b>	Understanding of the principles of co ordinate systems and map projections at a technician level	2-D and 3-D coordinate systems; grid reference systems; different types of map projections; SA Survey coordinate system.	<b>12</b>	<b>5</b>

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8	<b>Error Theory and Adjustments</b>	Ability to recognise and adjust observation errors at a technician level	The nature of observations and data acquisition, types of errors, accuracy, precision; Elementary adjustment of observations: levelling and traverse.	<b>12</b>	<b>5</b>
9	<b>Earth and Environmental Science</b>	Understanding the relevance of surveying with respect to the environment	A combination of any of the following: Climatology, Geomorphology, structural geology, engineering geology, interpretation of geological maps, integrated environmental management, environmental impact assessment, development science and theory, urban systems and human settlement, sustainable development, natural environmental systems (water, atmospheric, oceanographic, fauna/flora etc.), conservation (natural or heritage).	<b>12</b>	<b>5</b>
10	<b>Business and Project Management</b>	Ability to communicate and interact at an industrial level	Effective communication within the built environment (written and spoken communication, communication in the workplace); office organisation and methods; contracts; awareness of management theory	<b>6</b>	<b>3</b>
11	<b>Professional Practice and Ethics</b>	Understanding of the principles of ethics and professional conduct in a survey environment	Introduction to the relevant labour and geomatics legislation; professional ethics, Work reservation and misconduct.	<b>6</b>	<b>3</b>
12	<b>Category Specific project</b>	Technical proficiency in the application of relevant technologies and producing a related report	Report-Portfolio of evidence demonstrating practical skills in the application of relevant competencies applied in the surveying field including but not limited to triangulation, GPS, levelling, traversing and topographical surveys.	<b>30</b>	<b>13</b>
13	<b>Cadastral studies and land tenure</b>	Understanding of the South African cadastral system	Land law, land ownership. South African cadastral survey system and the Land Survey Act and Regulations, registration systems.	<b>6</b>	<b>3</b>
			<b>Grand Total</b>	<b>240</b>	<b>100</b>