



Vocational Pathways

MANUFACTURING AND TECHNOLOGY SECTOR



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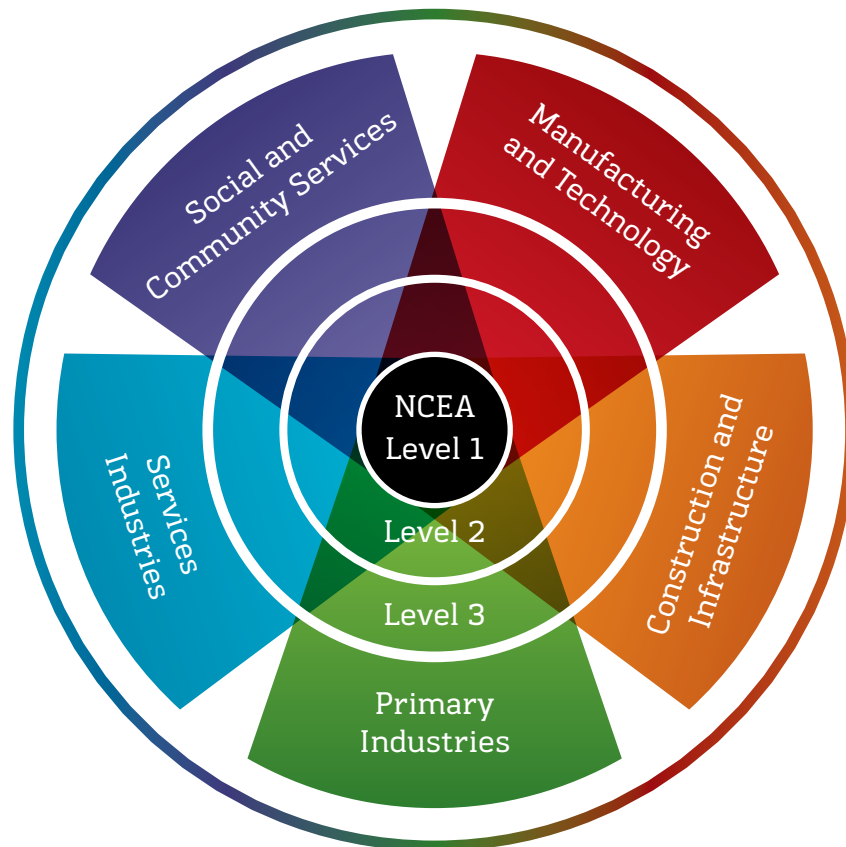
www.youthguarantee.net.nz

New Zealand Government

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Vocational Pathways



Vocational Pathways provide new ways to achieve NCEA Level 2 – the foundation for success in further education and the world of work.

The pathways help you see how your learning and achievement will be valued in the ‘real world’ when you look for a job and start your career.

Achieving Vocational Pathways means that you have developed skills, and achieved in areas that employers value, and that you have skills and knowledge that are relevant for their industries.

By achieving enough credits from the standards recommended by the sector, you can have manufacturing and technology recognised as your vocational pathway; this makes it easy for employers to see if you have the strengths and abilities they are looking for.

If you are aiming for a career in this sector, the pathway helps you to see which subjects and standards you should do to get to where you want to go.

And if you haven’t decided, but are thinking about the future, the pathways can help you see how your strengths and interests match up to an amazing range of jobs and study options out there.

You can use the Vocational Pathways to see where and how your learning relates to study options and employment opportunities. Visit www.youthguarantee.net.nz to find out more.

What's the work like?

From hands-on production and assembly to cutting edge research, from massive machines and busy production lines, to individual crafts or computer design, this sector covers a range of working styles and options. You might be working with huge lumps of metal or delicately assembling tiny component parts – so small you can't even see them, like in nanotechnology. Whatever you do, you'll be working indoors most of the time, with tools, machinery and equipment, or maybe a computer. You could be producing things in their millions, or making or designing individual one-offs. You might be fabricating, installing, fixing or maintaining systems, or doing a job involving lots of thinking, planning or making lots of calculations. Some roles are highly creative; many are methodical, detailed, precise. Generally in this pathway there's a very clear end point to the job you're doing and you'll know exactly what part you played in it. You'll be able say "I had a hand in that – I changed a life, it couldn't have happened without me."

What qualities will I need?

We're looking for people who are interested in making things work. You might be skilled with your hands, inquisitive and able to think outside the box and be keen to ask questions. At the same time, you'll have an eye for detail and good ability to concentrate. You may have design skills, technical skills, manual skills, computer skills, science skills, or creative skills, and you'll be comfortable using science and technology. You'll be happy to be part of a hard working team and get on well with your work mates, yet able to work on your own. You'll understand and respect the need for safety.



“When I was young I always used to help my Dad out at our family business, repairing small engines for lawnmowers, chainsaws – that sort of thing. I knew then that I wanted to work in a hands-on job.”

Cameron, 21, aerospace designer

What's great about this sector?

There's a mixture of skilled jobs across the sector, something to suit everyone. At the end of the day you feel like you've made a contribution, doing something you like doing, and getting paid for it! In the engineering industry in particular, people have the highest job satisfaction of all jobs.

Careers in technology, engineering and science are among the most exciting, varied and rewarding possible. They offer opportunities to travel, to make new discoveries, to work with creative, like-minded people and to make a practical difference to the world around you.

In manufacturing, chances are you'll be turning raw materials that aren't worth much on their own into valuable products worth many more times as much as the original raw material. And you get to do it not by sitting at a desk but by doing stuff, solving real problems by applying your own learned experience to the task. In this sector there will be opportunities to move up the career ladder or across industries.

Manufacturing

From jewellery design to steel making, meat processing to managing people and production lines, manufacturing uses tools, machines, processes and people to transform materials and substances into new, finished products for sale in New Zealand and overseas.

Technology

Technology applies scientific, mathematical and creative knowledge to our use of tools, machines, crafts and systems, to help find better ways of doing things and solve problems. Technology can be as simple as using hand-held tools, or as virtual simulation.

What key competencies do employers look for?

Employers will be matching your key competencies to their work place.

Use language symbols and texts

You'll need to have readable handwriting, understand and follow written instructions, procedures, simple tables and graphs. You'll manage basic measurement tasks and will know how to enter and extract basic information on computers.

Managing self

You'll be reliable; you'll arrive at work on time and in a fit state to work safely and well. You'll communicate with the right people when you can't be at work or when something has gone wrong. And you'll be willing to listen carefully to instructions and have the confidence to ask questions if you don't understand.

Thinking

Your employer will expect you to be able to recognise problems and understand what to do or who to ask to get them solved.

Relating to others

You'll know how to show respect to others especially more senior and experienced people and get along with your workmates.

Participating and contributing

You will work in a team and recognise your part within it and will respect the contribution of others. You will contribute to the greater good of the team to achieve organisational goals.

Where might I end up?

You can start off in a basic job and work your way through to owning your own company. Or you can stay in the job and be happy knowing exactly what's expected of you every day. Within any manufacturing or technology career you can move from industry to industry, and job to job.

You could go on to be a:

supervisor, manager, business owner, scientist or director of the board.



“I started as a packer, moved onto fabrication and now I lead the production team.”

Paul, Foreman, Food Manufacturing

What work could I do?

In manufacturing:

Assembler, appliance servicing, butcher, baker, designer, electrician, electrotechnology, engineer, supporting the engineering industry, industrial measurement or control, fixing machines, fabrication, fitter, inventory, logistics, machine operator, making, erecting and rigging steel, meat inspection, packing, processing, production planner, production manager, purchaser, quality control, shipping and receiving, testing, warehouse stock controller.

In technology:

Biotechnologist, designer, food technologist, telecommunications technician, production technologist, medical technologist.

Why is this sector important?

This sector is a big employer – the second largest in New Zealand. It is also a big earner for the New Zealand economy, making up almost half of all the country's export income. It is a sector the government has identified as a priority area for growth, so the future is bright.

Technology, and telecommunications in particular are fast-changing and expanding industries and another key to New Zealand's future. With a shortage of skilled workers in these industries, people who work and study for a career in the technology sector are in hot demand.

What industries could I work in?

Manufacturing:

You could be making products in any of these industries:

Aircraft manufacture, baking, boatbuilding, marine products, clothing, textiles, footwear and leather, concrete, dairy, defence force, electronics, food and beverage, glass, machinery and equipment, mechanical engineering, metal and related products, paint, petrol, chemicals and plastics, pharmaceutical, specialised crafts like jewellery, watches, furniture, upholstery, musical instruments, sports equipment, transport, wood and paper, medical instrumentation.

Technology:

You could be working in, or designing for:

Aeronautical and automotive engineering, clean or 'green' technologies, computer aided design, defence force products, engineering, electrotechnology, information and communications technology, marine technology, nano technology, robotics, software.

“It blows me away each time we roll out a finished aircraft. It's awesome to be able to say 'I helped build that beautiful machine' – just awesome.”

Dwayne Griffiths, 21, Pacific Aerospace

Find out more

about life and jobs in this sector by browsing the:

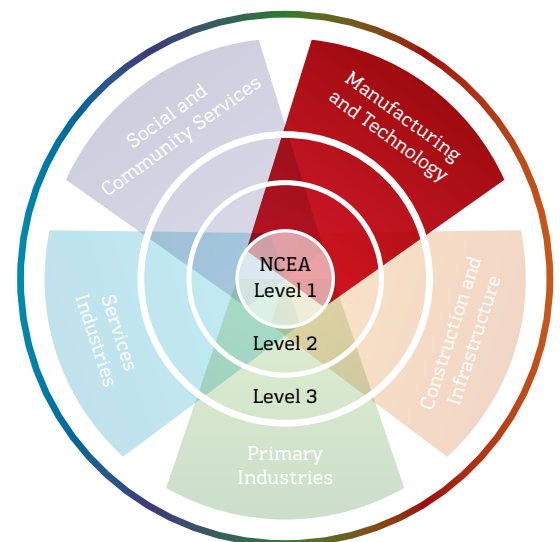
- Careers NZ industry and interest area lists on their website, which is part of the jobs database. Look for the different industries listed under the Manufacturing and the Engineering headings. See also logistics, trade and warehousing (www.careersnz.govt.nz)
- Institute of Professional Engineers' futureintech website where you can read about experiences of young professionals already working in technology, engineering and science careers (www.futureintech.org.nz)
- websites of the Industry Training Organisations working in this sector including The Skills Organisation (www.skills.org.nz) (electrical, electrotechnology, telecommunications, industrial measurement); Competenz, Motor Industry Training Organisation (www.mito.org.nz) (motor, industrial textile fabrication (www.competenz.org.nz) (engineering, manufacturing industries); NZITO (meat processing, dairy & leather manufacturing
- Just the Job videos on YouTube or TVNZ on demand.

Vocational Pathways Award

If your NCEA Level 2 includes enough credits from recommended standards, and you meet the NCEA literacy and numeracy requirement, you can have Manufacturing and Technology awarded as your Vocational Pathway on your NZQA Record of Achievement. This will be a real advantage when you get out there and look for work and training opportunities in the sector.

- **Achieve NCEA Level 2**
- **Meet the NCEA Literacy and Numeracy requirements** (20 credits at Level 1 or above)
- **Gain 60 Level 2 credits from recommended standards**
including
- **at least 20 Level 2 credits from sector-related standards**

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Recommended Assessment Standards

for the **Manufacturing and Technology** Pathway

The assessment standards on the following pages are recommended by the industries across our sector. So if you are looking for a pathway into manufacturing and technology, you would do well to focus on these subjects and work hard to achieve the standards listed here.

You don't need to do all of these standards! However, if you gain enough credits from the standards we recommend then you are gaining the skills, knowledge and competencies that are most important to employers in our sector.

But there's another way to look at it; if these are the subjects you enjoy, and these are the sorts of standards that you tend to do well in, then you should definitely consider the Manufacturing and Technology sector as a possible future for you. As you will see in the next section, there are heaps of opportunities, and a wide range and growing number of jobs at many different levels.

Level 1

These are the standards we recommend at level 1. If these are areas of strength or interest for you then you're making a great start at gaining the key skills you need in our sector.

Std No.	Title		Credits
Chemistry			
90930	1.1	Carry out a practical chemistry investigation, with direction	4
90931	1.2	Demonstrate understanding of the chemistry in a technological application	2
90932	1.3	Demonstrate understanding of aspects of carbon chemistry	4
90933	1.4	Demonstrate understanding of aspects of selected elements	4
90934	1.5	Demonstrate understanding of aspects of chemical reactions	4
Construction and Mechanical Technologies			
91057	1.20	Implement basic procedures using resistant materials to make a specified product	6
91058	1.21	Implement basic procedures using textile materials to make a specified product	6
91059	1.22	Demonstrate understanding of basic concepts used to make products from resistant materials	4
91060	1.23	Demonstrate understanding of basic concepts used to make products from textile materials	4
91061	1.24	Demonstrate understanding of basic concepts related to structures	3
91062	1.25	Demonstrate understanding of basic concepts related to machines	3
91096	1.26	Make basic adaptations to a pattern to enable a design to fit a person or item	4
Design and Visual Communication			
91063	1.30	Produce freehand sketches that communicate design ideas	3
91064	1.31	Produce instrumental, multi-view orthographic drawings that communicate technical features of design ideas	3
91065	1.32	Produce instrumental paraline drawings to communicate design ideas	3
91066	1.33	Use rendering techniques to communicate the form of design ideas	3
91067	1.34	Use the work of an influential designer to inform design ideas	3
91068	1.35	Undertake development of design ideas through graphics practice	6
91069	1.36	Promote an organised body of design work to an audience using visual communication techniques	4

Std No.	Title		Credits
Digital Technologies			
91070	1.40	Demonstrate understanding of basic concepts of information management	3
91071	1.41	Implement basic procedures to produce a specified digital information outcome	4
91072	1.42	Demonstrate understanding of basic concepts of digital media	3
91073	1.43	Implement basic procedures to produce a specified digital media outcome	4
91074	1.44	Demonstrate understanding of basic concepts from computer science	3
91075	1.45	Construct a plan for a basic computer program for a specified task	3
91076	1.46	Construct a basic computer program for a specified task	3
91077	1.47	Demonstrate understanding of basic concepts used in the design and construction of electronic environments	3
91078	1.48	Implement basic interfacing procedures in a specified electronic environment	3
91079	1.49	Implement basic techniques in constructing a specified electronic and embedded system	3
91080	1.50	Demonstrate understanding of the common components of basic digital infrastructures	3
91081	1.51	Implement basic procedures for servicing a personal computer system	4
English			
90849	1.1	Show understanding of specified aspect(s) of studied written text(s), using supporting evidence	4
90851	1.3	Show understanding of significant aspects of unfamiliar written text(s) through close reading, using supporting evidence	4
90053	1.5	Produce formal writing	3
90853	1.9	Use information literacy skills to form conclusion(s)	4
90854	1.10	Form personal responses to independently read texts, supported by evidence	4
90856	1.11	Show understanding of visual and/or oral text(s) through close viewing and/or listening, using supporting evidence	3
Generic Technology			
91044	1.1	Undertake brief development to address a need or opportunity	4
91045	1.2	Use planning tools to guide the technological development of an outcome to address a brief	4
91046	1.3	Use design ideas to produce a conceptual design for an outcome to address a brief	6
91047	1.4	Undertake development to make a prototype to address a brief	6
91048	1.5	Demonstrate understanding of how technological modelling supports decision-making	4
91049	1.6	Demonstrate understanding of how materials enable technological products to function	4
91050	1.7	Demonstrate understanding of the role of subsystems in technological systems	4
91051	1.8	Demonstrate understanding of how different disciplines influence a technological development	4
91052	1.9	Demonstrate understanding of the ways a technological outcome, people, and social and physical environments interact	4
91053	1.10	Demonstrate understanding of design elements	3
91054	1.11	Demonstrate understanding of basic human factors in design	4
91055	1.12	Demonstrate understanding of basic concepts used in manufacturing	4
91056	1.13	Implement a multi-unit manufacturing process	4

Std No.	Title		Credits
Mathematics and Statistics			
91026	1.1	Apply numeric reasoning in solving problems	4
91027	1.2	Apply algebraic procedures in solving problems	4
91028	1.3	Investigate relationships between tables, equations and graphs	4
91029	1.4	Apply linear algebra in solving problems	3
91030	1.5	Apply measurement in solving problems	3
91031	1.6	Apply geometric reasoning in solving problems	4
91032	1.7	Apply right-angled triangles in solving measurement problems	3
91033	1.8	Apply knowledge of geometric representations in solving problems	3
91034	1.9	Apply transformation geometry in solving problems	2
91035	1.10	Investigate a given multivariate data set using the statistical enquiry cycle	4
Physics			
90935	1.1	Carry out a practical physics investigation that leads to a linear mathematical relationship, with direction	4
90936	1.2	Demonstrate understanding of the physics of an application	2
90937	1.3	Demonstrate understanding of aspects of electricity and magnetism	4
90938	1.4	Demonstrate understanding of aspects of wave behaviour	4
90939	1.5	Demonstrate understanding of aspects of heat	4
Processing Technologies			
91082	1.60	Implement basic procedures to process a specified product	4
91083	1.61	Demonstrate understanding of basic concepts used in processing	4
91084	1.62	Demonstrate understanding of basic concepts used in preservation and packaging techniques for product storage	4
Science			
90940	1.1	Demonstrate understanding of aspects of mechanics	4
90941	1.2	Investigate implications of electricity and magnetism for everyday life	4
90942	1.3	Investigate implications of wave behaviour for everyday life	4
90943	1.4	Investigate implications of heat for everyday life	4
90944	1.5	Demonstrate understanding of aspects of acids and bases	4
90945	1.6	Investigate implications of the use of carbon compounds as fuels	4
90946	1.7	Investigate the implications of the properties of metals for their use in society	4
90947	1.8	Investigate selected chemical reactions	4
90950	1.11	Investigate biological ideas relating to interactions between humans and micro-organisms	4

Std No.	Title		Credits
Generic Computing			
18758		Find information using the Internet	2
18743		Produce a spreadsheet from instructions using supplied data	2
2792		Produce simple desktop published documents using templates	2
5946		Use computer technology to create and deliver a presentation from given content	3
18734		Create a web page using a template	2
25659		Create a web page using a mark-up language with a text editor	2
26745		Produce still images for a range of digital media	3

Std No.	Title	Credits
Interpersonal Communications		
1293	Be interviewed in an informal one-to-one, face-to-face interview	2
1285	Make inquiries and complete practical transactions	4
Service Sector – Core Skills		
64	Perform calculations for the workplace	2
56	Attend to customer enquiries face-to-face and on the telephone	2
Software Development – Programming		
18739	Create and use simple command sequences in a computer language	2

Std No.	Title	Credits
Core Electrical		
5909	Explain basic atomic principles as applied to the electrotechnology industry	1
5911	Explain basic magnetism and electromagnetism as applied to the electrotechnology industry	1
Engineering – Measurement		
4433	Select, use, and care for simple measuring devices used in engineering	2
Injection Moulding		
252	Perform basic process operations for injection moulding	4
Mechanical Engineering Technology		
22923	Demonstrate basic engineering workshop skills under close supervision	12
22924	Develop a simple product using engineering materials	10
22926	Demonstrate knowledge of safety procedures in a specific engineering workshop	2
Motor Industry – Introductory Skills		
15408	Describe motor vehicle safe motoring requirements and general locations of systems and components	4
Occupational Health and Safety Practice		
497	Demonstrate knowledge of workplace health and safety requirements	3
Paint Manufacturing		
20287	Demonstrate basic knowledge of paint and paint production	2
Plastics Materials		
23128	Demonstrate basic knowledge of plastics production processes and materials	3

“Working in the Weld Division gives me huge variety – from working on mining machines on-site, to travelling off-site to mines and quarries all over the country.”

Marc, Fitter/Welder

Level 2

Remember, if your NCEA Level 2 includes 60 credits from recommended standards, including at least 20 credits from sector-related standards, you can have Manufacturing and Technology recognised as your vocational pathway.

Recommended Standards

Std No.	Title		Credits
Chemistry			
91161	2.1	Carry out quantitative analysis	4
91162	2.2	Carry out procedures to identify ions present in solution	3
91163	2.3	Demonstrate understanding of the chemistry used in the development of a current technology	3
91164	2.4	Demonstrate understanding of bonding, structure, properties and energy changes	5
91165	2.5	Demonstrate understanding of the properties of selected organic compounds	4
91166	2.6	Demonstrate understanding of chemical reactivity	4
91167	2.7	Demonstrate understanding of oxidation-reduction	3
Design and Visual Communication			
91337	2.30	Use visual communication techniques to generate design ideas	3
91341	2.34	Develop a spatial design through graphics practice	6
91342	2.35	Develop a product design through graphics practice	6
91343	2.36	Use visual communication techniques to compose a presentation of a design	4
Generic Technology			
91354	2.1	Undertake brief development to address an issue	4
91355	2.2	Select and use planning tools to manage the development of an outcome	4
91356	2.3	Develop a conceptual design for an outcome	6
91358	2.5	Demonstrate understanding of how technological modelling supports risk management	4
91359	2.6	Demonstrate understanding of the role of material evaluation in product development	4
91361	2.8	Demonstrate understanding of sociocultural factors, and how competing priorities are managed, in technology	4
91362	2.9	Demonstrate understanding of the nature of technological outcomes	4
91363	2.10	Demonstrate understanding of sustainability in design	4
Mathematics and Statistics			
91256	2.1	Apply co-ordinate geometry methods in solving problems	2
91257	2.2	Apply graphical methods in solving problems	4
91258	2.3	Apply sequences and series in solving problems	2
91259	2.4	Apply trigonometric relationships in solving problems	3
91261	2.6	Apply algebraic methods in solving problems	4
91262	2.7	Apply calculus methods in solving problems	5

Std No.	Title		Credits
	Physics		
91168	2.1	Carry out a practical physics investigation that leads to a non-linear mathematical relationship	4
91169	2.2	Demonstrate understanding of physics relevant to a selected context	3
91170	2.3	Demonstrate understanding of waves	4
91171	2.4	Demonstrate understanding of mechanics	6
91172	2.5	Demonstrate understanding of atomic and nuclear physics	3
91173	2.6	Demonstrate understanding of electricity and electromagnetism	6

Std No.	Title		Credits
	Apparel Cutting and Sewing		
2846		Demonstrate knowledge of industrial apparel cutting and sewing	3
4838		Demonstrate knowledge of clothing materials in the clothing industry	3
23843		Demonstrate knowledge of production stages for an apparel manufacturing company	6
	Generic Computing		
2784		Create and use a computer spreadsheet to solve a problem	3
20332		Use the Internet for information retrieval in an organisation	3
2791		Integrate spreadsheet and database data into word processed documents to meet a set brief	3
2781		Manage and protect data in a personal computer system	3
25662		Use digital communications technologies	3
2783		Demonstrate knowledge of the components of personal computer systems	3
2786		Create and use a computer database to solve a problem	3
2788		Produce desktop published documents to meet a set brief	5
2790		Use and maintain personal computer peripherals	3
5940		Produce a presentation using a desktop presentation computer application	3
5957		Produce schematic diagrams using a computer application	2
6743		Demonstrate an understanding of ergonomic principles for computer workstations	2
25655		Create a website using a dedicated web-authoring tool to meet a set brief	3
25656		Create a website using a mark-up language to meet a set brief	3
26744		Produce a media application for use on a communication device to meet a set brief	5
	Reading		
2989		Select, assess, and read texts to gain knowledge	3
	Self-Management		
12349		Demonstrate knowledge of time management	3
	Software Development – Programming		
18740		Create a simple computer program to meet a set brief	3
	Work and Study Skills		
24871		Complete forms in a work-related context	2

Sector Related Standards

Std No.		Title	Credits
Construction and Mechanical Technologies			
91344	2.20	Implement advanced procedures using resistant materials to make a specified product with special features	6
91345	2.21	Implement advanced procedures using textile materials to make a specified product with special features	6
91347	2.22	Demonstrate understanding of advanced concepts used to make products	4
91346	2.23	Demonstrate understanding of advanced concepts used to make textile products	4
91348	2.24	Demonstrate understanding of advanced concepts related to structural frameworks	3
91349	2.25	Demonstrate understanding of advanced concepts related to machines	3
91350	2.26	Make advanced adaptations to a pattern to change the structural and style features of a design	4
Design and Visual Communication			
91338	2.31	Produce working drawings to communicate technical details of a design	4
91339	2.32	Produce instrumental perspective projection drawings to communicate design ideas	3
Digital Technologies			
91367	2.40	Demonstrate understanding of advanced concepts relating to managing shared information within information systems	3
91368	2.41	Implement advanced procedures to produce a specified digital information outcome with dynamically linked data	6
91369	2.42	Demonstrate understanding of advanced concepts of digital media	4
91370	2.43	Implement advanced procedures to produce a specified digital media outcome	4
91371	2.44	Demonstrate understanding of advanced concepts from computer science	4
91372	2.45	Construct a plan for an advanced computer program for a specified task	3
91373	2.46	Construct an advanced computer program for a specified task	3
91374	2.47	Demonstrate understanding of advanced concepts used in the construction of electronic environments	3
91375	2.48	Implement advanced interfacing procedures in a specified electronic environment	3
91376	2.49	Implement advanced techniques in constructing a specified advanced electronic and embedded system	3
91377	2.50	Demonstrate understanding of local area network technologies	3
91378	2.51	Implement procedures for administering a local area network	4

“The work is really different and interesting. You get to go out in the van to jobs by yourself and also get to work in a team. There’s plenty of variety.”

James, electrical security technician

Std No.		Title	Credits
Generic Technology			
91365	2.12	Demonstrate understanding of advanced concepts used in manufacturing	4
91366	2.13	Undertake development and implementation of an effective manufacturing process	6
91357	2.4	Undertake effective development to make and trial a prototype	6
91360	2.7	Demonstrate understanding of redundancy and reliability in technological systems	4
Processing Technologies			
91351	2.60	Implement advanced procedures to process a specified product	4
91352	2.61	Demonstrate understanding of advanced concepts used in processing	4
91353	2.62	Demonstrate understanding of advanced concepts used in preservation and packaging for product storage	4

Std No.		Title	Credits
Automotive Administration			
21672		Demonstrate knowledge of new and emerging technology in the motor industry	5
21673		Demonstrate knowledge of maintaining stock security in the motor and related industries	2
21674		Demonstrate knowledge of terminology used in the motor industry	2
Automotive Electrical and Electronics			
232		Test an automotive electrical circuit	8
234		Describe automotive starting and charging systems and their operation	4
235		Describe automotive ignition systems and their operation	4
3877		Demonstrate knowledge of protecting vehicle electronics in the motor industry	2
21667		Demonstrate knowledge of testing automotive electrical circuits	3
21675		Demonstrate knowledge of automotive batteries	2
21676		Select test equipment and test an automotive electrical circuit	4
21707		Demonstrate knowledge of automotive electrical principles	6
21719		Remove and replace motor vehicle lamps in the motor industry	1
Automotive Fuel Systems and Exhaust			
240		Demonstrate knowledge of petrol fuel systems	3
21677		Demonstrate knowledge of a diesel fuel system	2
21692		Perform minor servicing tasks on a diesel fuel system	2
Automotive Preventive Maintenance			
229		Identify the general locations and functions of motor vehicle systems and main components	4
247		Prepare a vehicle and/or machine for use and shutdown after use	2
21690		Perform general servicing checks on a motor vehicle	3
21679		Demonstrate knowledge of interchanging and balancing road wheels in the motor industry	2
21680		Demonstrate knowledge of automotive lubricants and sealants	2
21716		Select and apply lubricants and sealants for automotive and related industry applications	1

Std No.	Title	Credits
Automotive Transmission Systems		
239	Demonstrate knowledge of automotive manual transmissions	2
Automotive Workshop Engineering		
21682	Demonstrate knowledge of an oxy-acetylene welding plant in the motor industry	2
21685	Use an oxy-acetylene welding plant in the motor industry	3
230	Repair and manufacture automotive components by oxy-acetylene gas welding	3
924	Clean automotive components and maintain cleaning equipment	1
21671	Carry out general engineering tasks in the motor industry	4
21683	Demonstrate knowledge of MIG welding in the motor industry	2
21684	Use a MIG welding plant in the motor industry	3
21718	Demonstrate knowledge of hazardous materials used in the motor and related industries	2
21858	Demonstrate good work habits and perform safe work practices in the motor and related industries	4
21859	Select and use hand tools and workshop equipment for an automotive application	2
Baking		
23077	Demonstrate knowledge of common types and uses of baking equipment in the baking industry	4
23081	Demonstrate knowledge of product and basic terminology in the baking industry	3
Baking – Biscuit		
14727	Batch bake biscuit products	8
Baking – Bread		
14702	Prepare and weigh ingredients for white bread doughs using manual production methods	4
Baking – Pastry		
14728	Form and cut pastry doughs using manual production methods	6
Boatbuilding		
18161	Perform measurements and calculations used in boatbuilding	5
Core Electrical		
750	Demonstrate knowledge of electrical test instruments and take measurements	2
1178	Follow safe practices in an electrical workplace	3
5907	Work safely with electrical equipment	1
6626	Demonstrate knowledge of electrical and electronic components	3
15845	Draw and explain simple electrical diagrams	4
15846	Demonstrate knowledge of capacitors and semiconductor diodes	3
15847	Demonstrate knowledge of mathematics and mechanics for electrical trades	4
15848	Demonstrate knowledge of safeguards for use with portable electrical appliances	2
15849	Perform manual soldering and de-soldering procedures for electrotechnology work	2
15851	Demonstrate knowledge of electrical safety and safe working practices for electrical workers	3
15852	Isolate and test low-voltage electrical subcircuits	2
25070	Explain the properties of conductors, insulators, and semiconductors and their effect on electrical circuits	7
25071	Demonstrate knowledge of electromotive force (e.m.f.) production	3
25072	Demonstrate knowledge of electromagnetism theory	5
5934	Prevent electrostatic damage to electronic components	1
Digital Processes for Print		
23554	Demonstrate knowledge of safe working practices in a digital print environment	5
Electrical Installation and Maintenance		
5922	Use cutting tools and machines in the performance of electrical installation and maintenance	2

Std No.	Title	Credits
Electronics Technology		
18239	Demonstrate introductory knowledge of circuit concepts and measurements for electronics	5
18240	Demonstrate knowledge of basic electronic components	5
18241	Demonstrate knowledge of basic electronic systems	5
18242	Construct a simple printed circuit	3
18243	Construct simple electronic products from supplied circuit schematics	6
Engineering – Fabrication		
25075	Perform basic fabrication operations under supervision	12
Engineering – Materials		
20917	Demonstrate basic knowledge of engineering materials	2
Engineering – Measurement		
4435	Select, use, and care for engineering dimensional measuring equipment	3
4436	Select, use, and care for engineering marking-out equipment	4
Engineering Core Skills		
2395	Select, use, and care for, engineering hand tools	4
2396	Select, use and maintain portable hand held engineering power tools	4
21905	Demonstrate knowledge of trade calculations and units for mechanical engineering trades	6
21906	Perform basic mechanical engineering machining operations under supervision	12
21908	Demonstrate knowledge of basic mechanics for mechanical engineering trades	3
21909	Demonstrate knowledge of fasteners used in mechanical engineering	1
21911	Demonstrate knowledge of safety on engineering worksites	2
21913	Shift loads in engineering installation, maintenance, and fabrication work	2
Engineering Drawing and Design		
2430	Manually produce and interpret engineering sketches under supervision	4
2431	Manually produce and interpret simple engineering component drawings under supervision	8
2432	Manually construct plane geometric shapes for engineering	3
2433	Produce simple engineering component drawings using CAD software	6
Engines		
231	Explain the operation of two and four stroke petrol and diesel engines	4
21688	Demonstrate knowledge of disassembling and reassembling a four stroke multi-cylinder engine	3
Food and Related Product Processing – Safety and Health		
7755	Apply safe working practices in the food or related product processing workplace	2
Furniture Making		
18917	Construct hand joints for furniture	3
18918	Construct a furniture carcass	6
2199	Use and maintain hand tools for furniture making	4
16231	Calculate lengths, areas, and costs and percentages of waste for furniture making	3
14995	Construct free-hand drawings for use in furniture making	2
9786	Set and operate a sanding machine to sand shaped furniture components	2
Furniture Operations		
16235	Demonstrate knowledge of manufactured boards used in furniture operations	4
Marine Sales and Services		
9913	Demonstrate knowledge of the New Zealand marine industry	3

Std No.	Title	Credits
Mechanical Assembly		
2387	Assemble mechanical components under supervision	2
Motor Industry – Introductory Skills		
16113	Demonstrate knowledge of safe working practices in an automotive workshop	2
21669	Demonstrate knowledge of hand tools and workshop equipment for motor industry applications	2
21670	Demonstrate knowledge of general engineering tasks in the motor industry	3
21668	Demonstrate knowledge of cleaning automotive components	2
3856	Identify emergency procedures in the motor and related industries	2
Plastics Materials		
23130	Classify and name plastics materials	8
Printing – Screen		
5131	Wash up for screen printing	4
Printing Production		
2281	Demonstrate knowledge of the print industry	7
20058	Demonstrate understanding of trade calculations for the print industry	5
340	Demonstrate knowledge of safe working practices in the print industry	5
Tyres		
21722	Balance wheels off a vehicle in the motor industry	2
Vehicle Bodywork		
399	Detail and groom a vehicle	4
21694	Mask a repair for priming; and prime, fill, and sand a repair in the motor body industry	3
21695	Repair minor panel damage, shrink, and metal finish a repair in the motor body industry	3
21696	Apply finish coats of paint to a complete panel in the motor body industry	2
21697	Demonstrate knowledge of repairing minor panel damage and shrinking a repair in the motor industry	2
21698	Remove and replace exterior and interior motor body parts and trim in the motor industry	3
21699	Prepare a painted surface and prepare bare metal for painting in the motor body industry	3
21701	Demonstrate knowledge of exterior and interior motor body parts and trim in the motor industry	2
21710	Fill and sand a repair in the motor body industry	1
Vehicle Braking Systems		
242	Change the fluid and bleed a brake hydraulic system	2
21689	Demonstrate knowledge of hydraulic brake fluid, fluid replacement, and brake bleeding procedures	2
21720	Demonstrate knowledge of vehicle braking systems	2
Vehicle Steering and Suspension		
21721	Demonstrate knowledge of vehicle steering and suspension systems	2
Welding		
21907	Demonstrate and apply knowledge of safe welding procedures under supervision	3

Std No.	Title	Credits
Wood Manufacturing Foundation Skills		
5634	Demonstrate knowledge of workplace health and safety in the wood manufacturing industries	3
736	Demonstrate knowledge of physical characteristics of wood	5
17971	Demonstrate knowledge of the solid wood manufacturing industry	5
22973	Demonstrate knowledge of factors that affect the performance of wood manufacturing workers	10
156	Demonstrate knowledge of phytosanitary standards in the wood manufacturing industry	3
162	Demonstrate knowledge of the principles of wood drying	5
15774	Demonstrate knowledge of timber machining	5
16244	Demonstrate knowledge of wood preservation	5
17860	Demonstrate knowledge of principles of matter, energy, and chemistry used in wood manufacturing industries	8
17861	Demonstrate knowledge of principles of heat, energy, and work as used in wood manufacturing	8
27074	Demonstrate knowledge of timber grading	5
Wood Panel Manufacturing Skills		
21482	Demonstrate knowledge of the wood panels industry and its products	10
Wood Product Manufacturing Skills		
17964	Demonstrate knowledge of the wood product manufacturing industry	5



Job Profiles

for the Manufacturing and Technology Sector

There are a huge number of roles and occupations available in this sector, ranging from entry level through to high level.

Even for entry level jobs or apprenticeships, NCEA Level 2 is the minimum you need nowadays, because it means you will have a good foundation in the skills and competencies you will need to go further. For other roles, you'll definitely need to further your education after school, by undertaking tertiary study, or training on the job.

More information about all of the roles listed here can be found on the Careers New Zealand Website www.careers.govt.nz along with key information about the job, what it pays, and current opportunities.

To find out the pay, prospects, and study costs of a number of jobs you can also check out the Occupation Outlook – www.dol.govt.nz/occupation-outlook.



The 'dots' in the following table show the level (or levels) of qualification usually associated with the role. Sometimes you need a specific qualification to get into a job, but in many areas you can work towards higher qualifications by learning on the job. Check out the job profiles on www.careers.govt.nz, or talk to your careers advisor to find out more.

	NZQF Level	2	3-4-5	5-6	7	8-10
		NCEA Level 2	Trade Certificate	Diploma	Degree	Postgraduate Degree
Aeronautical Engineer					•	•
Aircraft Maintenance Engineer			•	•		
Architect					•	•
Architectural Technician				•	•	
Automotive Electrician		•	•			
Automotive Mechanic		•	•			
Baker		•	•			
Bicycle Mechanic		•				
Biochemist					•	•
Biomedical Engineer					•	•
Biomedical Technician (Mechanical and Electronic)				•	•	
Biotechnologist					•	•
Boat Builder		•	•			
Boiler Attendant		•	•			
Brewer		•	•	•	•	
Butcher		•	•			
Cabinet Maker		•	•			
Chemical Engineer					•	•
Chemical Production Operator		•	•			
Chemist					•	•
Civil Engineer					•	•
Civil Engineering Technician/Draughtsperson				•	•	
Clothing Designer		•	•	•	•	
Clothing Marker/Cutter		•	•	•		
Clothing Pattern Maker		•	•	•		
Computer Systems Technician			•	•		
Crane Operator			•	•		
Dairy Products Maker		•	•	•		
Database/Systems Administrator			•	•	•	•
Electrical Engineer					•	
Electrical Engineering Technician				•	•	
Electrician			•			
Electronics Engineer				•	•	
Electronics Trades Worker		•	•			
Energy and Chemical Plant Operator		•	•			
Engineering Machinist		•	•			
Environmental Engineer					•	
Fabrication Engineer		•	•			

	NZQF Level	2	3-4-5	5-6	7	8-10
		NCEA Level 2	Trade Certificate	Diploma	Degree	Postgraduate Degree
Food and Beverage Factory Worker		●				
Food Technologist				●	●	●
Fork-Lift Operator			●			
Furniture Finisher		●	●			
Game Developer				●	●	
Glass Processor		●	●			
Graphic Pre-Press Worker		●	●			
Importer/Exporter		●		●	●	
Industrial Designer					●	●
Industrial Spray Painter		●	●			
Information and Communication Technology Manager				●	●	●
Jeweller		●	●	●	●	
Joiner		●	●			
Lift Technician		●	●			
Light Technician		●	●	●	●	
Line Mechanic			●			
Locksmith			●			
Marine Engineer			●	●	●	
Meat Inspector			●			
Meat/Seafood Process Worker		●				
Mechanical Engineer					●	●
Mechanical Engineering Technician				●	●	
Medical Laboratory Scientist					●	
Metal Worker		●	●			
Panelbeater		●	●			
Picture Framer		●				
Plastics Technician			●	●		
Plastics Worker		●	●			
Print Finisher		●	●			
Printer		●	●			
Product Assembler		●	●			
Production Manager				●	●	
Programmer				●	●	
Project Manager				●	●	
Pulp and Paper Mill Operator		●	●			
Purchasing/Supply Officer		●	●	●	●	
Recycler/Dismantler						
Refrigeration/Air-conditioning Technician		●	●			
Saw Doctor		●	●			
Science Technician				●	●	
Screen Printer		●	●			
Sewing Machinist		●	●			

NZQF Level	2	3-4-5	5-6	7	8-10
	NCEA Level 2	Trade Certificate	Diploma	Degree	Postgraduate Degree
Software Architect			•	•	•
Systems Analyst				•	•
Tailor/Dressmaker	•	•	•	•	
Technical Writer				•	
Telecommunications Engineer			•	•	
Telecommunications Technician		•			
Toolmaker		•			
Tyre Technician	•				
Upholsterer	•	•			
Vehicle Body Builder/Trimmer	•	•			
Vehicle Painter	•	•			
Watchmaker and Repairer	•	•			
Water/Waste Water Treatment Operator		•		•	
Web Developer			•	•	
Website Administrator				•	•
Welder	•	•			
Winemaker		•	•	•	
Wood Machinist	•	•			
Wood Processing Worker	•				

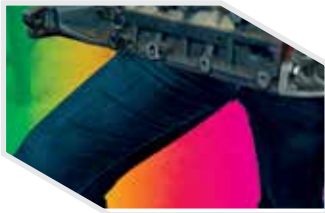


“I’ve always been a practical person who likes finishing everything I start – I learn best when doing and creating things with materials and tools.”

William, Sheetmetal/Light Fabrication

“The best thing about my job is... I get to be creative and I’m not stuck in an office! Being creative doesn’t mean you have to be good at art in school, you learn how to decorate and be artistic as part of the job.”

Holly, cake decorator





Vocational Pathways



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