

**Scottish Group Award Specifications**

SGA in:	<b>Engineering</b>		
Level:	<b>Intermediate 2</b>	Code:	<b>G5AC 11</b>



## Summary of requirements

### SGA in Engineering at Intermediate 2

#### National Courses and Units required\*

*2 National Courses (8 credits) at Intermediate 2 from:*

Automotive Engineering  
Electronic and Electrical Fundamentals  
Engineering Craft Skills  
Fabrication and Welding  
Mathematics  
Structures  
Technological Studies

*Details in specific section*

**plus**

*2 mandatory National Units (2 x 0.5 credit):*

Engineering Quality Awareness (Int 2)  
Personal and Social Development: Accident and Emergency Procedures (Int 2)

*Details in specific section*

**plus**

*7 credits at minimum of Intermediate 1*

*Details in specific section*

**Total 16 credits**

#### Core skills required\*

*The above must include or cover:*

1 core skill at Intermediate 2  
4 core skills at Intermediate 1

*Details in specific section*

\*See Important Note on page 4.

# Rules for credit contribution

## Important Note\* Achievement above the minimum requirements

The specification shows the **minimum** requirements for this SGA. Where possible, centres may wish to encourage candidates to exceed this minimum. Candidates achieving above the minimum specification will have this achievement recorded on their Scottish Qualifications Certificate. For example the following can be achieved above the minimum requirement:

- Core Skills at levels above those specified
- more National Courses and Units at Intermediate 2 instead of the credits at Intermediate 1
- National Course grades, eg grade A or B instead of grade C
- more than the required two National Courses, in which case each additional course completed counts as four credits

## Hierarchies

- courses and units can be substituted by those with the same title at a higher level, eg Technological Studies (Int 2) can be substituted by Technological Studies (H) (See Section C)

## Double counting

- courses and units with the same title at different levels cannot both contribute credits to the SGA, eg **either** Numeracy (Int 1) **or** Numeracy (Int 2)
- courses at the same level in the same subject cannot both contribute credits to the SGA, eg **either** the National Course in Technological Studies at Intermediate 2 **or** Standard Grade Technological Studies at Credit Level (See Section D)
- same course with different grades cannot both contribute credits to the SGA, eg **either** Fabrication and Welding (Int 2) at grade A **or** Fabrication and Welding (Int 2) at grade C

## National Course award at Grade D

National Course awards at Grade D can contribute to the SGA in the following ways:

- in place of the specified mandatory or optional Intermediate 2 Courses, a grade D at Higher (or above) in a Course of the same title can contribute 4 credits to the SGA
- in place of the specified optional Intermediate 1 Courses, a grade D at Intermediate 2 (or above) in a Course of the same title can contribute 4 credits to the SGA.

Note - The former compensatory course awards (fallbacks) can also contribute to the SGA:

- in place of the specified mandatory or optional Intermediate 2 Courses, a compensatory award for a Course of the same title taken at Higher (ie awarded at Intermediate 2) can contribute 4 credits to the SGA
- in place of the specified optional Intermediate 1 Courses, a compensatory award for a Course of the same title taken at Intermediate 2 (ie awarded at Intermediate 1) can contribute 4 credits to the SGA.

## Specific section

# A

This section specifies: mandatory courses, mandatory units, mandatory combinations of courses and/or units, mandatory core skill requirements and optional courses and units.

\*Mandatory unit of a course. †Optional unit of a course. All other units are free-standing National Units.  
 [ ]Bracketed numbers indicate the former coding for these unrevised National Units.

Course/unit no	Course/unit title	Credits
<b>Two National Courses from:</b>		
C01S 11	Automotive Engineering (Int 2)	4
C025 11	Electronic and Electrical Fundamentals (Int 2)	4
C034 11	Engineering Craft Skills (Int 2)	4
C01T 11	Fabrication and Welding (Int 2)	4
C018 11	Structures (Int 2)	4
C036 11	Technological Studies (Int 2)	4
C06C 11	Electrical Installation Fundamentals (Int 2)	4
<b>Or one National Course from the above and one from:</b>		
C100 11	Mathematics: Maths 1, 2 and 3 (Int 2)	4
C101 11	Mathematics: Maths 1, 2 and Stats (Int 2)	4
<b>plus two mandatory National Units:</b>		
D06G 11	Engineering Quality Awareness (Int 2)	0.5
E9F5 11	Personal and Social Development: Accident and Emergency Procedures (Int 2) [91180]	0.5
		<b>Total credits required: 9</b>

**plus any combination of courses, component units and free-standing units to gain seven credits (at minimum Int 1) from the above (not already chosen) and/or from:**

### Automotive Engineering

Free-standing National Units:

EG3F 11	Automotive: Braking Systems (Int 2) [2210198]	0.5
EG3J 11	Automotive: Fuel Systems (Int 2) [2210228]	1.5
EG3P 11	Automotive: Steering Systems (Int 2) [2210278]	0.5
EG3R 11	Automotive: Suspension Systems (Int 2) [2210288]	0.5
EG3S 11	Automotive: Transmission Systems (Int 2) [2210298]	0.5
EG3T 11	Automotive: Wheels and Tyres (Int 2) [2210308]	1

### Electronics/Instrumentation

Free-standing National Units:

ED8A 11	Electrical and Wiring Hand Skills (Int 2) [2160014]	1
D996 11	Electronic Systems: An Introduction (Int 2)	0.5
ED6T 11	Industrial Measurement and Control (Int 2) [3151034]	1
EC19 11	Industrial Science 2 (Int 2) [3251963]	1
E9S9 11	Introduction to Electronic Test Equipment and Measurements (Int 2) [2150410]	0.5

Course/unit no	Course/unit title	Credits
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### Electronics/Instrumentation

Free-standing National Units: (continued)

ED8C 11	Soldering Techniques on Electronic Circuits (Int 2) [2150034]	1
D995 10	Electrical Systems: An Introduction (Int 1)	0.5
D378 10	Electronics (Int 1)	0.5
D9EP 10	Wiring and Assembly Techniques (Int 1)	0.5
D9EN 10	Electronic Simulation and Testing	1

### Engineering Craft Skills

Course:

C034 10	Engineering Craft Skills (Int 1) <sup>1</sup>	4
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Component units of course:

D178 10	*Bench Skills – Metal (Int 1)	1
D179 10	*Machine Processes – Metal (Int 1)	1
D180 10	†Fabrication and Welding (Int 1)	1
D181 10	†Practical Electronics (Int 1)	1

<sup>1</sup> See Rules for credit contribution

### Fabrication and Welding

Free-standing National Units:

E7RH 11	Assembly Skills (Int 2) [64020]	0.5
ED8G 11	Basic Sheet Metal Working Skills (Int 2) [2270504]	2
D989 11	Engineering Materials: Metals (Int 2)	1
D990 11	Engineering Materials: Non Metals (Int 2)	0.5
E96H 11	Engineering Systems 1: Machines and Mechanisms (Int 2) [84410]	1
EC19 11	Industrial Science 2 (Int 2) [3251963]	1
EE1H 11	Introduction to Arc and Resistance Welding Processes (Int 2) [2270614]	0.5
ED8D 11	Introduction to CAD/CAM (Int 2) [2260304]	0.5
EE9W 11	Introduction to Fabrication and Joining Processes (Int 2) [2270006]	1
ED8M 11	Introduction to Gas Shielded Welding Skills (Int 2) [2270754]	1
EE18 11	Introduction to Oxy-Fuel Gas Cutting and Joining Skills (Int 2) [2270454]	1
EC1K 11	Materials Handling 2 (Int 2) [3251013]	1
EC1C 11	Operational Procedures: Processing (Int 2) [3251213]	1
D998 11	Robotics: An Introduction (Int 2)	0.5
EE1A 11	Self-Secured Joints (Int 2) [2270494]	0.5
D999 11	Workshop Skills: An Introduction (Int 2)	1

### Graphic Communication

maximum of one credit from this option

Component units of Graphic Communication course:

D173 11	*Computer Graphics (Int 2)	1
D172 11	*Technical Graphics 2 (Int 2)	1

Free-standing National Unit:

D997 11	Graphical Communication: An Introduction (Int 2)	1
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Course/unit no	Course/unit title	Credits
<b>Mathematics</b>		maximum of three credits from this option
Component units of Mathematics course:		
D321 10	Mathematics 1 (Int 1)	1
D322 10	Mathematics 2 (Int 1)	1
D323 10	Mathematics 3 (Int 1)	1
D324 10	Applications of Mathematics (Int 1)	1
Free-standing National Unit:		
D11T 10	Core Mathematics 3 (Int 1) [7180321]	1
ED51 12	Mathematics: Analysis/Algebra 2 (H) [7180414]	1
D11W 11	Mathematics: Analysis/Algebra 1 (Int 2) [7180401]	1
<b>Mechanical/Manufacture</b>		
Component unit of Craft and Design course:		
D127 11	*Designing for Manufacture (Int 2)	1
Free-standing National Units:		
E9L8 11	Aeronautical Fundamentals (Int 2) [2230010]	1
E7RH 11	Assembly Skills (Int 2) [64020]	0.5
ED8E 11	Basic Engineering Materials (Int 2) [2250404]	0.5
E8LH 11	CNC Computer Aided Part Programming (Int 2) [74695]	1
E8LC 11	Dimensional Control 1: Measurement and Testing (Int 2) [74630]	0.5
E7W2 11	Dimensional Control 2: Measurement Standards (Int 2) [64631]	1
D989 11	Engineering Materials: Metals (Int 2)	1
D990 11	Engineering Materials: Non-Metals (Int 2)	0.5
E96H 11	Engineering Systems 1: Machines and Mechanisms (Int 2) [84410]	1
E7TB 11	Fault Diagnosis Techniques (Int 2) [64419]	0.5
ED6T 11	Industrial Measurement and Control (Int 2) [3151034]	1
EC19 11	Industrial Science 2 (Int 2) [3251963]	1
ED8D 11	Introduction to CAD/CAM (Int 2) [2260304]	0.5
E9CF 11	Introduction to Dynamics (Int 2) [94005]	0.5
E9S9 11	Introduction to Electronic Test Equipment and Measurements (Int 2) [2150410]	0.5
E8LN 11	Introductory Machining Skills (Int 2) [74702]	1
EC1K 11	Materials Handling 2 (Int 2) [3251013]	1
E7W0 11	Measurement Methods (Int 2) [64601]	0.5
EC1C 11	Operational Procedures: Processing (Int 2) [3251213]	1
E80X 11	Polymer Processes 1 (Int 2) [64982]	1
D998 11	Robotics: An Introduction (Int 2)	0.5
D999 11	Workshop Skills: An Introduction (Int 2)	1
E96V 10	Theory of Flight (Int 1) [84541]	0.5

Course/unit no	Course/unit title	Credits
<b>Plant Installation</b>		
Free-standing National Units:		
E7RH 11	Assembly Skills (Int 2) [64020]	0.5
E96B 11	Basic Electrical Plant Safety and Maintenance (Int 2) [84169]	1
ED8E 11	Basic Engineering Materials (Int 2) [2250404]	0.5
E8LC 11	Dimensional Control 1: Measuring and Testing (Int 2) [74630]	0.5
E7W2 11	Dimensional Control 2: Measurement Standards (Int 2) [64631]	1
ED8A 11	Electrical and Wiring Hand Skills (Int 2) [2160014]	1
D996 11	Electronic Systems: An Introduction (Int 2)	0.5
E7TP 11	Engine Diagnostics: Mechanical (Int 2) [64437]	0.5
D989 11	Engineering Materials: Metals (Int 2)	1
D990 11	Engineering Materials: Non Metals (Int 2)	0.5
E96H 11	Engineering Systems 1: Machines and Mechanisms (Int 2) [84410]	1
ED6T 11	Industrial Measurement and Control (Int 2) [3151034]	1
E7WD 11	Industrial Plant (Int 2) [64723]	1
EC19 11	Industrial Science 2 (Int 2) [3251963]	1
E9CF 11	Introduction to Dynamics (Int 2) [94005]	0.5
E9S9 11	Introduction to Electronic Test Equipment and Measurements (Int 2) [2150410]	0.5
EC1K 11	Materials Handling 2 (Int 2) [3251013]	1
EC1C 11	Operational Procedures: Processing (Int 2) [3251213]	1
D998 11	Robotics: An Introduction (Int 2)	0.5
D999 11	Workshop Skills: An Introduction (Int 2)	1
D995 10	Electrical Systems: An Introduction (Int 1)	0.5
<b>Practice</b> maximum of two credits from this option		
Free-standing National Units:		
ED8A 11	Electrical and Wiring Hand Skills (Int 2) [2160014]	1
ED8N 11	Fastening and Joining: Non-Thermal Methods (Int 2) [2270804]	0.5
EE1H 11	Introduction to Arc and Resistance Welding Processes (Int 2) [2270614]	0.5
D999 11	Workshop Skills: An Introduction (Int 2)	1
<b>Theory</b> maximum of two credits from this option		
Component unit of Structures course:		
D105 11	*Fundamentals of Manufacture and Assembly Techniques (Int 2)	1
Free-standing National Units:		
D996 11	Electronic Systems: An Introduction (Int 2)	0.5
ED8D 11	Introduction to CAD/CAM (Int 2) [2260304]	0.5
D998 11	Robotics: An Introduction (Int 2)	0.5
D11T 10	Core Mathematics 3 (Int 1) [7180321]	1
D995 10	Electrical Systems: An Introduction (Int 1)	0.5



Course/unit no	Course/unit title	Credits
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**Working with Others**

Free-standing National Units:

ED0W 10	Team Working (Int 1) [7351303]	0.5
D36H 10	Work Experience (Int 1)	1

**Core Skills**

Free-standing National Units:

D01B 10	Communication (Int 1)	1
D01C 10	Numeracy (Int 1)	1
D01D 10	Information Technology (Int 1)	1
D01E 11	Problem Solving (Int 2)	1
D01F 10	Working with Others (Int 1)	1

SVQs can contribute credits to this SGA. (See Section E)

**Total credits required: 7**

*16 credits*

**\*\* Core skills requirement**

- Communication at Intermediate 1
- Numeracy at Intermediate 1
- Information Technology at Intermediate 1
- Problem Solving at Intermediate 2
- Working with Others at Intermediate 1

\*\* See Section B for core skills details.

# Rules for credit contribution

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For example the following can be achieved above the minimum requirement:

- Core Skills at levels above those specified
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## Hierarchies

- courses and units can be substituted by those with the same title at a higher level, eg Technological Studies (Int 2) can be substituted by Technological Studies (H) (See Section C)

## Double counting

- courses and units with the same title at different levels cannot both contribute credits to the SGA, eg **either** Numeracy (Int 1) **or** Numeracy (Int 2)
- courses at the same level in the same subject cannot both contribute credits to the SGA, eg **either** the National Course in Technological Studies at Intermediate 2 **or** Standard Grade Technological Studies at Credit Level (See Section D)
- same course with different grades cannot both contribute credits to the SGA, eg **either** Fabrication and Welding (Int 2) at grade A **or** Fabrication and Welding (Int 2) at grade C

## National Course award at Grade D

National Course awards at Grade D can contribute to the SGA in the following ways:

- in place of the specified mandatory or optional Intermediate 2 Courses, a grade D at Higher (or above) in a Course of the same title can contribute 4 credits to the SGA
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## Core skills

B

To achieve this SGA, all candidates **must achieve** the following core skills:

Core skill	Level
Communication	Intermediate 1
Numeracy	Intermediate 1
Information Technology	Intermediate 1
Problem Solving	Intermediate 2
Working with Others	Intermediate 1

One or more core skills units in this SGA may be automatically certificated through mandatory courses and units. Where this is the case, the corresponding core skill unit in this section cannot be counted towards the SGA.

Candidates can achieve core skills:

- through Standard Grades or other units which give automatic certification of core skills, eg a candidate who has completed Standard Grade English and Mathematics at General Level is given automatic certification of Communication and Numeracy at Intermediate 1
- by selecting from the group award units and courses which give automatic certification of core skills, eg the Intermediate 2 course in Technological Studies gives automatic certification of Problem Solving and Numeracy at Intermediate 2 and Information Technology at Intermediate 1
- by doing dedicated core skills units – these units can contribute credits to the SGA and should be achieved through integration with appropriate subject specialist units. However, if the candidate wishes, the unit credits need not contribute to the SGA.

Candidates' current level of achievement in core skills is shown on the Scottish Qualifications Certificate in the form of a profile. This shows achievement against each of the core skills *components*. Where a core skill has more than one component, the candidate needs to achieve each component at the level specified for the SGA. For example, if an SGA requires Problem Solving at Intermediate 1, a candidate whose profile shows Critical Thinking and Planning and Organising at Intermediate 1 and Reviewing and Evaluating at Access 3 would not meet the requirement and would have to improve in Reviewing and Evaluating.

Details of all courses which give automatic certification of core skills is published in the *Catalogue of Core Skills in National Qualifications* (SQA, 2001/2002).



## Hierarchical sequences

C

The SQA numbering system for qualifications consists of a 4 + 2 reference code.

The qualifications in a hierarchical sequence have the same title and are available at more than one level. They are identified by their reference code having the same first four digits, eg D186 in the example below. The last two digits are unique to each level of qualification, eg 12 equates to Higher, 11 equates to Intermediate 2.

### Units

The following is an example of a hierarchical sequence of units:

D186 11	Applied Electronics (Int 2)
D186 12	Applied Electronics (H)
D186 13	Applied Electronics (AH)

Where units which are part of hierarchical sequences are specified, candidates who achieve a unit at a higher level than the one specified can use the upper level unit to count as credit towards the group award. For example, Applied Electronics (Int 2) can be counted instead of Applied Electronics (Int 1).

Candidates can only use one of these units to count as credit towards the group award.

In the case of unrevised National Certificate Modules, ie units which retain their original number, there are hierarchies where the title is the same and the number is different. Details of these exceptions will be published in a separate document. The pattern for these hierarchies is the same as that previously established for GSVQs.

There are also some hierarchies where the titles and numbers of the units at different levels are different. In this specification, if there are two units at different levels with heavily overlapping content, only one of these units should be used to count as credit towards the group award. Details of these exceptions will be published in a separate document.

### Courses

The following is an example of a hierarchical sequence of courses:

C036 11	Technological Studies (Int 2)
C036 12	Technological Studies (H)
C036 13	Technological Studies (AH)

In the SGA specification, where courses which belong to hierarchical sequences are specified, candidates who achieve a course at a higher level than the one specified can use the upper level course to count as credit towards the group award. For example, Technological Studies (H) can be counted instead of Technological Studies (Int 2).

Candidates can only use one of these courses to count as credit towards the group award - a maximum of 4 credits.



## Standard Grades

D

Designated Standard Grades at the appropriate level can each contribute 4 credits to the SGA in place of corresponding National Courses.

The designated Standard Grades and their corresponding National Courses, either of which can contribute to this SGA, are as follows:

### Standard Grade\*

### National Course

Craft and Design at Credit Level

Engineering Craft Skills (Int 2)

Mathematics at Credit Level

Mathematics (Int 2)

Technological Studies at Credit Level

Technological Studies (Int 2)

Craft and Design at General Level

Engineering Craft Skills (Int 1)

Mathematics at General Level

Mathematics (Int 1)

\*If achieved prior to 1994 please contact SQA Helpdesk ☎ 0141 242 2214.





## SVQs

E

Relevant Scottish Vocational Qualifications (SVQs) at the appropriate level can each contribute up to eight credits to an SGA.

SVQs at Level 2 contribute credits at Intermediate 2.

SVQs at Level 1 contribute credits at Intermediate 1.

In this particular SGA any SVQs from occupational area 004 (Engineering) can each contribute 7 credits. Specific SVQs from the following areas can each contribute 7 credits:

002 (Extracting and Providing Natural Resources)

005 (Manufacturing)

006 (Transporting)

Code no	Relevant SVQs	Level
<b>002 Extracting and Providing Natural Resources</b>		
G325 22	Electricity Distribution and Transmission Engineering Support	2
G311 22	Fishing Vessel Engineering	2
G324 22	Nuclear Decommissioning	2
G615 22	Operating Hydro Generation Systems	2
G31R 22	Operating Single Electricity Generation Systems	2
G31W 22	Maintaining Electricity Generation Systems (Control and Instrumentation)	2
G31S 22	Maintaining Electricity Generation Systems (Electrical)	2
G320 22	Maintaining Electricity Generation Systems (Electrical/Control and Instrumentation)	2
G31V 22	Maintaining Electricity Generation Systems (Mechanical)	2
G31Y 22	Maintaining Electricity Generation Systems (Mechanical/Control and Instrumentation)	2
G31X 22	Maintaining Electricity Generation Systems (Mechanical/Electrical)	2
G321 22	Maintaining Electricity Generation Systems (Mechanical/Electrical Control and Instrumentation)	2
<b>004 Engineering</b>		
G38G 22	Engineering Manufacture: Foundation	2
G5KY 22	Performing Engineering Operations	2
G5KY 21	Performing Engineering Operations	1
<b>005 Manufacture</b>		
G38J 22	Performing Manufacturing Operations	2
G2VE 21	Performing Manufacturing Operations	1

Code no	Relevant SVQs	Level
<b>006 Transporting</b>		
G5C3 22	Rail Transport Engineering: Maintenance (Communication Systems)	2
G5C5 22	Rail Transport Engineering: Maintenance (Electrification)	2
G5C4 22	Rail Transport Engineering: Maintenance (Permanent Way)	2
G5C7 22	Rail Transport Engineering: Maintenance (Plant)	2
G5C2 22	Rail Transport Engineering: Maintenance (Signal Engineering)	2
G5C6 22	Rail Transport Engineering: Maintenance (Traction and Rolling Stock)	2
G5CB 22	Rail Transport Operations (Control Room Operations)	2
G5C8 22	Rail Transport Operations (Driving)	2
G5CC 22	Rail Transport Operations (Passenger Services)	2
G5C9 22	Rail Transport Operations (Shunting)	2
G5CA 22	Rail Transport Operations (Signal Operations)	2

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