Course Notes
for
EIT: Academic Skills

Fachsprachenzentrum / University Language Center
Wintersemester 2023-24

INDEX

Academic Skills for EIT
Winter Semester 2023/24 / Information sheet

Coordination: Dr James Slawney.
Your lecturer: Mr Matthew Cohn, Fachsprachenzentrum (Email: **cohn@fsz.fra-uas.de**)
This course revises and expands your English knowledge (at least CEFR B2+) through technical themes and professional skills to prepare for working in an international engineering environment.
2 SWS **Total work load**: 60 hours **Self-instruction:** 30 hours
All four language skills are exercised: listening, reading, speaking and writing.
Level of the course: B2 *Niveaustufen des Gemeinsamen Europäischen Referenzrahmen* / CEFR (*GER*)

Required material

- **Academic Skills EIT Course Notes:** available as download from Moodle

CampUAS platform
Cohn: Academic Skills EIT - Winter Sem 23-24 (Password: **machines**)

Course Content

- **Technical themes** describing technical functions; Describing specific materials; Describing component shapes; Working with drawings
- **Writing skills** based on lectures and pair-work practice in class.
- **Presentation skills** based on lectures and personal research.

Assessment:

This is a portfolio examination consisting of the following:

- 60 minute written **examination** (50% of student's grade);
- A **presentation** on a technical topic (25% of student's grade);
- A **written technical report** (25% of student's grade).

Further conditions:

- **Attendance:** Regular attendance is necessary in order to be adequately prepared for the exam
- **Completion of set tasks at home.** Learning any language requires much practice!
- You must be willing to complete the **any work assigned by your teacher**.

Further practice

- **Recommended English magazine for engineers:** inchbyinch.de
- **Websites (examples):** TED.com; bbc.co.uk (Technology); ieee.org; howstuffworks.com; youtube: one-minute physics
  Grammar practice on the internet: ego4u.com; *study zone* (University of Victoria)
- **Online dictionaries and translation help:** (examples): dict.cc ; reverso ; dict.leo.org; dict.tu-chemnitz.de ; linguee.de ; wordnik.com
- **Additional language courses** are offered by the University Language Center (*Fachsprachenzentrum)*. See our homepage for details: LINK

Timetable & Lesson Guide

Lessons	Date	Block	Content:
Textbook & Exercises			
1&2	17/10/23	Block 4 14.15-15.45	**Introduction**
		Block 5 16.00-17.30	**Cambridge English for Engineering:** Unit 1 - Technology in use
3&4	24/10/23	Block 4 14.15-15.45	**Cambridge English for Engineering:** Unit 2 - Materials Technology
		Block 5 16.00-17.30	**Cambridge English for Engineering:** Unit 2 - Materials Technology
5&6	31/10/23	Block 4 14.15-15.45	**Cambridge English for Engineering:** Unit 3 - Components and Assemblies
		Block 5 16.00-17.30	**Cambridge English for Engineering:** Unit 3 - Components and Assemblies
7&8	07/11/23	Block 4 14.15-15.45	**Cambridge English for Engineering:** Unit 4 - Engineering Design
		Block 5 16.00-17.30	**Cambridge English for Engineering:** Unit 4 - Engineering Design
9&10	14/11/23	Block 4 14.15-15.45	**Cambridge English for Engineering:** Unit 5 - Breaking Point
		Block 5 16.00-17.30	**Cambridge English for Engineering:** Unit 5 - Breaking Point
Writing Practice			
11&12	21/11/23	Block 4 14.15-15.45	Style & grammar tips // Explaining info. from diagrams // Pair writing task
		Block 5 16.00-17.30	Pair writing task // Selected corrections by your instructor
13&14	05/12/23	Block 4 14.15-15.45	Style & grammar tips // Interpreting & comparing data // Pair writing task 1
		Block 5 16.00-17.30	Pair writing task 2 // Selected corrections by your instructor
How to give a presentation?			
15&16	28/11/23	Block 4 14.15-15.45	**Speaking English publicly:** Examples of presentations; Do's and don'ts; Discussion
		Block 5 16.00-17.30	**Speaking English publicly:** Presentation examples and practice
Emailing; Resume & CVs; Cover emails			
17&18	12/12/23	Block 4 14.15-15.45	Emailing practice
		Block 5 16.00-17.30	Emailing practice
19&20	19/12/23	Block 4 14.15-15.45	CVs and resumes for electrical engineering positions.
		Block 5 16.00-17.30	Cover emails for electrical engineering positions
Presentations			
21&22	09/01/24	Block 4 14.15-15.45	Block 5 16.00-17.30	**Presentations**
23&24	16/01/24	Block 4 14.15-15.45	Block 5 16.00-17.30	**Presentations**
25&26	23/01/24	Block 4 14.15-15.45	Block 5 16.00-17.30	**Presentations**
27&28	30/01/24	Block 4 14.15-15.45	Block 5 16.00-17.30	**Presentations**
29&30	06/02/24	Block 4 14.15-15.45		**Exam preparation**
		Block 5 16.00-17.30		**Exam preparation**

TEXTBOOK EXCERPTS

UNIT 1 Technology in use

- Describing technical functions and applications
- Explaining how technology works
- Emphasising technical advantages
- Simplifying and illustrating technical explanations

Describing technical functions and applications

1 a **In pairs, think about two or three products you use regularly and discuss the following questions.**

- What are the main functions of the products? (What do they do?)
- What are their different applications? (What are they used for?)

b **What do you know about Global Positioning System (GPS) devices? In pairs, describe their main function, and give some examples of different applications of GPS devices.**

2 a ▶1.1 **Paula, a design engineer for a GPS manufacturer, is discussing product development with José, a senior manager new to the company. Listen to the conversation and complete the following notes.**

- the primary application of GPS (1) _____
- associated applications Tracking systems for (2) _____
  Tracking systems for (3) _____
- more creative features (4) _____ alarms
  (5) _____ buttons
- not technical innovations (6) _____ the technology

b **Complete the following extracts from the discussion with words that come from *use*.**

1 *Then you've got associated applications, _____ that are related to navigating ...*
2 *... tracking systems you can _____ for monitoring delivery vehicles ...*
3 *... from the end-_____ point of view, accuracy is no longer the main selling point. Most devices are accurate enough. The key is to make them more _____ .*

3 a **Match the GPS applications (1–6) to the descriptions (a–f).**

1	topographical surveying	a	navigation and safety at sea
2	geological exploration	b	setting out positions and levels of new structures
3	civil engineering	c	mapping surface features
4	avionics equipment	d	applications in mining and the oil industry
5	maritime applications	e	highway navigation and vehicle tracking
6	GPS in cars and trucks	f	air traffic control, navigation and autopilot systems

b **In pairs, practise explaining the applications of GPS in Exercise 3a to a colleague who has limited knowledge of the devices using the following phrases.**

used for -ing used to useful for another / a similar use

4 a **Complete the following extracts from the conversation by underlining the correct words.**

1 *... there's a setting on the GPS that* ***allows/prevents*** *it to detect the movement ...*

2 *... an alarm sounds to warn you, and* ***allows/prevents*** *the boat from drifting unnoticed.*

3 *... and* ***enables/ensures*** *that you don't lose track of where you were, which then* ***enables/ensures*** *you to turn round and come back to the same point ...*

b **Match the words in Exercise 4a to the synonyms.**

1 _____ – makes sure 2 _____ / _____ – permits 3 _____ – stops

c **Complete the following extract from the user's manual of a GPS device using the verbs in Exercise 4a. Sometimes, more than one answer is possible.**

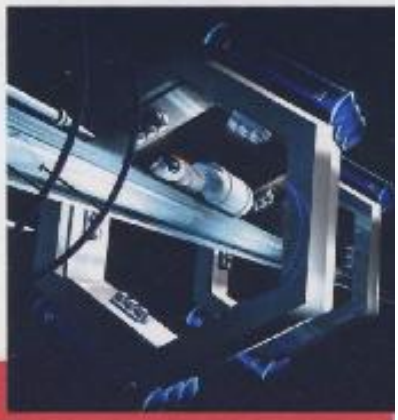
INTRODUCTION

The core function of your GPS receiver is to (1) _____ you to locate your precise geographical position. To (2) _____ the device to function, it receives at least three signals simultaneously from the GPS constellation – 30 dedicated satellites which (3) _____ receivers can function anywhere on earth. To (4) _____ extremely precise positioning and (5) _____ errors from occurring due to external factors, this device is designed to receive four separate signals (see enhanced system accuracy on page 18).

5 **In pairs, explain the main functions and applications of a product made by your company or a product you know about. Student A, you are an engineering manager; Student B, you are a new employee. Use the language from this section and the phrases in the box. Swap roles and practise again.**

I see. So ... OK. In other words ... So you mean ...

Explaining how technology works



6 a **In pairs, look at the picture and discuss the following questions.**

- How do you think a space elevator would work?
- What could it be used for?
- What technical challenges would it face?
- How seriously do you think the concept of space elevators is being taken at present?

b **Read the following article and compare it to your answers in Exercise 6a.**

Space elevators: preparing for takeoff

IN his 1979 novel, *The Fountains of Paradise*, Arthur C Clarke wrote about an elevator **connecting** the earth's surface to space. Three decades later, this science-fiction concept is preparing to take off in the real world. NASA has launched the Space Elevator Challenge, a competition with a generous prize fund, and several teams and companies are working on serious research projects aimed at winning it.

As its name suggests, a space elevator is designed to **raise** things into space. Satellites, components for space ships, supplies for astronauts in space stations, and even astronauts themselves are examples of payloads that could be **transported** into orbit without the need for explosive and environmentally unfriendly rockets. However, the altitude of orbital space – a colossal 35,790 km above the earth – is a measure of the challenge facing engineers. How could such a height be reached?

The answer is by using an incredibly strong and lightweight cable, strong enough to **support** its own weight and a heavy load. The design of such a cable is still largely theoretical. This would be **attached** to a base station on earth at one end and a satellite in geostationary orbit (fixed above a point on the equator) at the other. Lift vehicles would then **ascend** and **descend** the cable, **powered** by electromagnetic force and **controlled** remotely.

c **Match the verbs (1–9) from the text in Exercise 6b to the definitions (a–i).**

1	connecting	a	carried (objects, over a distance)
2	raise	b	hold something firmly / bear its weight
3	transported	c	climb down
4	support	d	provided with energy / moved by a force
5	attached	e	joining
6	ascend	f	driven / have movement directed
7	descend	g	fixed
8	powered	h	climb up
9	controlled	i	lift / make something go up

7 a **James, an engineer, is giving a talk on space elevators. Complete his notes using the correct form of the verbs (1–7) in Exercise 6c.**

Space Elevators

- *Challenge of (1)* connecting *a satellite to earth by cable is significant.*
- *To (2)* _____ *its own weight, and be securely (3)* _____ *at each end, cable would need phenomenal strength-to-weight ratio.*
- *How could vehicles be (4)* _____ *into space, up cable?*
- *Self-contained energy source problematic, due to weight (heavy fuel or batteries required to (5)* _____ *vehicle).*
- *Two possible ways round problem:*

1 Transmit electricity wirelessly. But technique only at research stage.

2 Solar power. But would only allow vehicle to (6) _____ *slowly. Not necessarily a problem, as car could be controlled remotely, allowing it to (7)* _____ *payloads unmanned.*

b ▶1.2 **Listen to part of James' talk and check your answers in Exercise 7a.**

c **What kinds of word are missing from the notes? In pairs, compare the audioscript on page 86 with the notes in Exercise 7a.**

8 a **Some space elevator designs propose an offshore base station. In pairs, discuss how such a system might work using words in Exercise 6c. What advantages might an offshore base have compared with a land base?**

b ▶1.3 **James goes on to discuss offshore base stations. Listen to the talk and answer the following questions.**

1 How would an offshore base station be supported?
2 What would the function of its anchors be?
3 How would payloads reach the base station?
4 What problem would a mobile base station help to prevent?
5 What would the procedure be if there was an alert?

9 a **You are members of a space elevator research team designing a concept for offshore base stations. In pairs, analyse the notes below, which were made during a briefing given by your manager. Imagine you are giving a presentation. Begin by reading out the abbreviated notes in full.**

OFFSHORE BASE STATION – ANCHORING & PROPULSION ISSUES

Anchoring system

Wind loads on cable will be huge. What implications for anchoring system? Base will need to be moved continually, sometimes urgently. What temp system could be used to hold base in position?

Base in shallow water near coast, or deep water further offshore? Choice will have impact on design of anchor system.

Propulsion system

Will weight of cable allow base to be moved by own propellers? Or more powerful system for propulsion and control nec? E.g. extern. power source?

b **In pairs, discuss the questions raised in the notes and think of some suitable solutions for the anchoring system and the propulsion system. At this stage, these should be overall concepts, not detailed designs. Remember to make notes.**

c **In small groups, take turns to give a short talk using your notes to explain how the systems work, in general terms. Imagine you are speaking to a small group of colleagues, including your manager.**

d **Write two or three paragraphs to summarise your talk. These will be included in your manager's longer report on offshore base stations.**

Emphasising technical advantages

10 In pairs, discuss the term *technical advantage*. Give some examples of technology you are familiar with.

11 a Read the first paragraph of some promotional literature from Otis, a leading elevator company. What is the Gen2™ system?

b Match the words (1–6) from the text in Exercise 11a to the synonyms (a–f).

1	conventional	a	decreases
2	eliminates	b	better / the best
3	superior	c	improved
4	energy-efficient	d	standard, usual
5	enhanced	e	gets rid of
6	reduces	f	has low energy consumption

c Complete the following text using the correct form of the words (1–6) in Exercise 11b. You will need to use some words more than once.

OTIS Unique Flat Belt

The key to Otis's patented drive technology

At the heart of the Gen2™ elevator system is a flat belt developed by and unique to Otis. It is just 3mm thick. Yet it is stronger than **conventional** steel cables. It lasts up to three times longer. And it has enabled Otis to completely re-invent the elevator. The flat, coated steel belt totally **eliminates** the metal-to-metal effect of conventional systems. Coupled with a smooth-surface crowned machine sheave, the result is exceptionally quiet operation and **superior** ride comfort. Furthermore, the flexible flat belt enables a more compact, **energy-efficient** machine, which can be contained in the hoistway. This **enhanced** technology **reduces** building and system operating costs, and frees up valuable space.

Protecting the environment

Neither the belt nor the gearless machine, with its permanently sealed bearings, requires any lubrication so the Gen2™ system is cleaner for the environment. The highly (1) energy-efficient gearless machine, with its permanent-magnet synchronous motor, (2) _____ power consumption by as much as 50 percent over (3) _____ geared machines and 15 percent over other machines with permanent-magnet motors of axial construction.

Reliable by design

Long-lasting flat belts, smooth, crowned sheaves and minimal moving parts in the gearless machine dramatically (4) _____ wear and increase durability and efficiency. To further (5) _____ reliability and safety, Otis developed the Pulse™ system, which continually monitors the status of the belts' steel cords. Unlike visual inspections of (6) _____ steel ropes, the Pulse™ system automatically detects and reports belt faults to maintenance personnel for rapid response, providing owners with greater peace of mind. With flat belt technology, Otis has created a (7) _____ system that (8) _____ the need for a machine room, is quiet, clean, reliable and economical, and easy to install and maintain.

d In pairs, summarise the advantages of the flat belt system. Discuss durability, wear, noise, space, cleanliness, efficiency, automation, maintenance and cost.

12 a **Complete the following tips on emphasising technical advantages using the words in the box.**

conventional	eliminated	enhanced	reduced	superior

When describing technical advantages, it's useful to emphasise ...

a (1) _____ performance, compared with the older model of the same product.
b negative issues that have been (2) _____ , or completely (3) _____ .
c special features that differentiate the technology from (4) _____ systems.
d performance levels that make the technology (5) _____ to the competition.

b ▶1.4 **Stefan, an engineer, is briefing some sales colleagues on the advantages of a new pump design. Listen to the briefing and match the tips (a–d) in Exercise 12a to the extracts (1–4).**

Extract 1 _____ Extract 2 _____ Extract 3 _____ Extract 4 _____

c **Complete the following sentences from the briefing by underlining the correct emphasising word.**

1 *We've come up with a* ***completely/significantly*** *unique profile.*
2 *It* ***completely/dramatically*** *reduces vibration.*
3 *Machines like these can never be* ***entirely/highly*** *free from vibration.*
4 *The new design runs* ***dramatically/extremely*** *smoothly.*
5 *Another advantage of the new profile is that it's* ***considerably/entirely*** *lighter.*
6 *So compared with our previous range, it's* ***highly/totally*** *efficient.*
7 *Trials so far suggest the design is* ***completely/exceptionally*** *durable.*
8 *We expect it to be* ***entirely/significantly*** *more reliable than rival units.*

d **Match the words in Exercise 12c to the synonyms.**

considerably	dramatically	entirely	exceptionally	highly	totally

1 _____ / _____ = completely
2 _____ / _____ – significantly
3 _____ / _____ – extremely

13 **You are Otis engineers back in the 1850s, when elevators were new. In pairs, prepare a short talk to brief your sales colleagues on the advantages of elevators for lifting people and goods. Emphasise the points below, using the phrases and techniques from this section. Remember that people at this time are sceptical about the technology.**

Elevators are ...

- safe – a reliable braking system eliminates the danger of a car falling if a cable fails
- simple – they're controlled from the car and are very easy to operate
- convenient – they're easier on the legs than the conventional alternative (stairs)
- valuable – they enhance the value of land by allowing taller buildings on smaller areas

Simplifying and illustrating technical explanations

14 a ▶1.5 **Richard, a structural engineer, often takes clients on guided tours of their new buildings during construction. He is talking about explaining technical concepts to non-specialists. Listen and answer the following questions.**

1 What does Richard say about explaining technical concepts?
2 What does he mean by *dull* explanations?
3 What is *being patronising*?

b In pairs, think of some tips on how to solve the following problems.

1 not being understood
2 being patronising
3 explaining difficult concepts
4 sounding dull

c ▶1.6 **Richard is giving some advice about the problems in Exercise 14b. Listen and summarise his ideas. Compare his tips with your suggestions.**

15 a Richard has made notes for a guided tour of a site. The project is a skyscraper in the early stages of construction. During the tour he explains the technical terms to the non-specialist group. In pairs, discuss the following terms and try to interpret them using everyday language to rephrase them.

SUBSTRUCTURE
- *Pile foundations (in general)*
- *Bored in situ concrete piles*
- *Pre-cast driven concrete piles*
- *Pile driver*
- *Pile auger*
- *Bentonite*

b ▶1.7 **Richard is giving a tour of a construction site. Listen and make notes of his explanations of the following technical terms. Compare your ideas with his.**

1 the substructure — the part of the structure below ground
2 a pile foundation — .....
3 to bore (a pile) — .....
4 in situ concrete — .....
5 pre-cast piles — .....
6 to drive in (a pile) — .....
7 a pile driver — .....
8 a pile auger — .....
9 bentonite — .....

c **Listen again and compare Richard's explanations with the tips in Exercise 14c. Which techniques did he use? Were they successful?**

d **Complete the following table using the words in the box.**

basically (x2) call effectively essentially imagine other picture refer ~~simple~~ simply

Function	Words / Phrases
1 Simplifying the language	in simple terms / put _____ / in _____ words / _____
2 Simplifying the concept	_____ / _____ / _____
3 Focusing on technical terms	what we _____ / what we _____ to as
4 Illustrating with images	if you _____ / if you _____

e **In pairs, practise explaining the technical terms in Exercise 15a using the simplified words and phrases in Exercise 15d.**

16 **Read the textbook description of two types of pile foundation. Use the words and phrases in Exercise 15d and the following notes to rephrase it.**

From a structural perspective, pile foundations can be divided into two categories: end-bearing piles and friction piles.

Imagine water and the seabed

End-bearing piles are driven or bored through soft ground in order to attain firm substrata below. The pile then transmits load vertically to firm subsoil or bedrock. The soft ground surrounding the sides of the pile is structurally redundant.

Like standing on stilts in water

Friction piles counteract downward loads from the structure through frictional resistance between the sides of the pile and the surrounding ground, and do not therefore rely on firm substrata. In some cases, the diameter of the concrete at the pile's base is widened by compaction, allowing the increased area to give the friction pile a certain degree of end-bearing resistance.

Like a nail in wood

Imagine a leg and a foot

17 **You are showing a non-specialist visitor around your company and explaining technical concepts using simplified language. In pairs, practise explaining a product or type of technology that you are familiar with.**

UNIT 2 Materials technology

- Describing specific materials
- Categorising materials
- Specifying and describing properties
- Discussing quality issues

Describing specific materials

1 **In pairs, discuss the benefits and problems of recycling. Use the following examples and your own ideas.**

breaking up ships demolishing buildings recycling electronics scrapping cars

2 a **Read the following web page and complete the missing headings using the words in the box.**

Aluminium Copper Glass Plastic Rubber ~~Steel~~ Timber

RECYCLABLE MATERIALS

1 Steel Scrap can be sorted easily using magnetism. If the metal is galvanised (coated with zinc) the zinc is fully recyclable. If it is stainless steel, other metals mixed with the iron, such as chromium and nickel, can also be recovered and recycled. More ...

2 _____ Sorting is critical, as there are key differences between the clear and coloured material used in bottles and jars, and the high-grade material used in engineering applications, which contains traces of metals. More ...

3 _____ Scarcity makes recycling especially desirable, and justifies the cost of removing insulation from electric wires, which are a major source of scrap. Pure metal can also be recovered from alloys derived from it, notably brass (which also contains quantities of zinc, and often lead) and bronze (which contains tin). More ...

4 _____ The cost of melting down existing metal is significantly cheaper than the energy-intensive process of electrolysis, which is required to extract new metal from ore. More ...

5 _____ Hardwood and softwood can be reused. However, the frequent need to remove ironmongery and saw or plane off damaged edges, can make the process costly. More ...

6 _____ Tyres are the primary source of recyclable material. These can be reused whole in certain applications. They can also be ground into crumbs which have varied uses. More ...

7 _____ An obstacle to recycling is the need to sort waste carefully. While some types can be melted down for reuse, many cannot, or result in low-grade material. More ...

b **Match the materials from the web page (1–8) in Exercise 2 to the definitions (a–h).**

1	stainless steel	a	a metal used to make brass, and in galvanised coatings on steel
2	zinc	b	the predominant metal in steel
3	iron	c	a type of steel not needing a protective coating, as it doesn't rust
4	bronze	d	a dense, poisonous metal
5	lead	e	rocks from which metals can be extracted
6	hardwood	f	an alloy made from copper and tin
7	ore	g	timber from pine trees
8	softwood	h	timber from deciduous trees

c **Complete the following sentences using *from*, *with* or *of*.**

1 Bronze contains significant amounts ___of___ copper.
2 Galvanised steel is steel coated _____ zinc.
3 Steel is an alloy derived _____ iron.
4 Pure metals can usually be recovered _____ alloys.
5 To produce stainless steel, iron is mixed _____ other metals.
6 Stainless steel contains quantities _____ chromium and nickel.
7 Glass tableware contains traces _____ metals, such as lead.
8 When new metal is extracted _____ ore, the costs can be high.

d **In pairs, ask and answer questions about different materials using the following phrases.**

Can ... be recycled? What's ... made from? Where does ... come from?

3 **a** **Irina, an ecological adviser, is talking to a group of engineers on a training course about environmentally friendly design. In pairs, discuss the ideas from her slide and give some examples.**

Environmental audit

Product phases:

• Pre-use • In use • Post-use

b ▶2.1 **Listen to an extract from the talk and compare your ideas with what Irina says. What example does she use to illustrate her main point?**

c ▶2.2 **Irina asks the engineers to do a simplified environmental audit. Their task is to compare steel and aluminium car bodywork from an ecological perspective. Listen to Sophia and Pete, two of the engineers, discussing the topic and make notes of their ideas.**

d **In pairs, do an environmental audit for the following applications and materials. Use the words and phrases in the box.**

	Application	Materials
1	electrical wires in vehicles	copper and aluminium
2	external walls in houses	bricks and softwood

as far as I know ... I think so / I'd say so I'm (not) sure
that's an important consideration that needs to be researched
coated derived mixed recovered recycled

Categorising materials

4 **What do you know about braking systems? In pairs, discuss the following questions.**

1 Generally speaking, what do brakes do and how do they work?
2 What kinds of material are used in brake pads and brake discs in different vehicles?

5 a **Read the article on braking systems. In the title of the article, what do the colours green and red refer to?**

b **In pairs, answer the following questions.**

1 Why do most braking systems waste energy?
2 What are regenerative braking systems, and how do they save energy?
3 What characteristics are required of materials used for the brakes on racing cars?
4 What is meant by *heat soak*, and why is it a problem in racing cars?

GREEN BRAKES

– A RED HOT TOPIC IN MOTOR RACING

As motor racing goes green, Formula 1 is aiming to lead automotive research in finding hi-tech efficiency gains. One of the keys to this ecological drive is regenerative braking (also known as kinetic energy recovery), which recovers energy generated during deceleration, and stores it as a source of power for subsequent acceleration.

Regenerative brakes limit the energy loss inherent in traditional braking systems. In most vehicles, conventional brakes comprise pads previously made from asbestos-based composites, but now consisting of **compounds*** of **exotic**, non-hazardous materials, and discs made of **ferrous** metal. The resulting friction generates heat, which is wasted. In performance cars, this phenomenon is taken to extremes, and due to the high temperatures generated, brake discs are often made out of **ceramics**.

The carbon discs and pads used on Formula 1 cars generate so much heat that they glow red hot. High temperatures are, in fact, necessary for the effective operation of carbon brakes. But there's still plenty of potential for recovering the kinetic energy, rather than merely dissipating it in the form of heat.

The potential for recovering energy also extends to the heat generated by engines and exhaust systems. This area has also been discussed as a possible area for future exploitation in motor racing. Heat recovery might offer the added benefit of reducing heat soak (thermal absorption by the chassis) as delicate **alloy** parts and sensitive **non-metallic** materials, such as **polymers**, are susceptible to heat damage.

c **Match the materials from the text (1–7) to the descriptions (a–g).**

1	compounds	a	materials that are not metal
2	exotic	b	iron and steel
3	ferrous	c	combinations of materials
4	ceramics	d	mixture of metals
5	alloy	e	plastic materials
6	non-metallic	f	minerals transformed by heat
7	polymers	g	rare or complex

d **In pairs, take turns to describe an object using the words from Exercise 5c and the phrases in the box. Ask your partner to guess what it is.**

comprise	consist of	made from	made of	made out of

6 a **You are going to give a talk on composites technology at a construction materials trade fair. In part of the talk, you focus on reinforced concrete as a well-known example of a composite material. Prepare your talk using words and phrases from this section and the following notes.**

Composite materials

Common example: reinforced concrete (very widely used composite)

Cement (derived from lime)

Aggregate – fine aggregate (sand) + coarse aggregate (gravel or crushed stone)

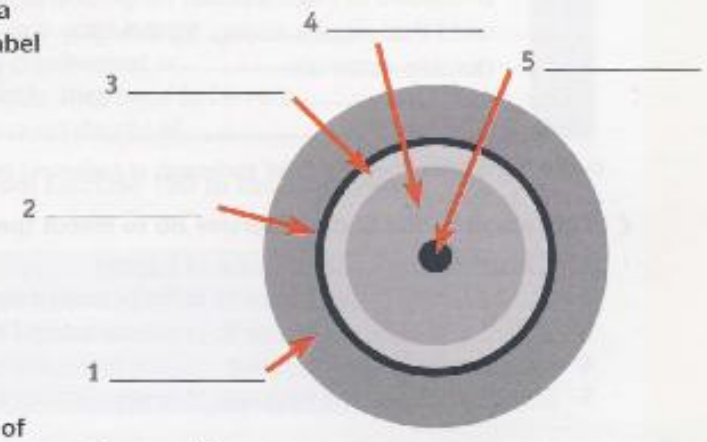
Water + chemical additives (e.g. plasticiser to improve workability)

Reinforcement (steel bars, fixed together with steel tie wire)

b **In small groups, take turns to give your talk.**

c **Margit, a sales engineer, is describing a high-voltage cable. Before you listen, label the cross-section with the parts (a–e).**

a insulation
b waterproof membrane
c outer jacket
d armoured protection
e conductor



d ▶2.3 **Listen to the description and check your answers in Exercise 6c.**

e **Match the parts of the cable (a–e) in Exercise 6c to the following categories of materials (1–5). You will need to use some parts more than once.**

1 non-metallic a, ____, ____
2 metallic ____, ____
3 ferrous metal ____
4 non-ferrous metal ____
5 polymer-based ____, ____, ____

7 **Imagine you are presenting a product or appliance you know well to a potential client. Describe the categories of material used to make the different parts.**

Specifying and describing properties

8 a **In pairs, discuss what you know about the properties of Kevlar® and how it is used.**

b **Read the following extract from DuPont™'s technical guide to Kevlar®. Compare the information with your ideas from Exercise 8a.**

WHAT IS KEVLAR®?

DuPont™ KEVLAR® is an organic fiber in the aromatic polyamide family. The unique properties and distinct chemical composition of KEVLAR® distinguish it from other commercial, man-made fibers.

KEVLAR® has a unique combination of high modulus, toughness, abrasion resistance and thermal stability. It was developed for demanding industrial and advanced-technology applications. Currently, many types of KEVLAR® are produced to meet a broad range of end uses that require strong, lightweight, durable materials.

c **Find words in the text in Exercise 8b to match the following definitions.**

1 toughness – the opposite of fragility
2 _____ – resistance to damage caused by friction
3 _____ – resistance to problems caused by temperature change
4 _____ – long-lasting
5 _____ – the opposite of heavy

9 a **Match the automotive parts (1–5) to the descriptions (a–e).**

1	drive belts	a	sheets inserted between parts to prevent gas or fluid leakage
2	brake pads	b	pneumatic envelopes in contact with the road surface
3	tyres	c	flexible bands used in transmission systems
4	sealing gaskets	d	protective barriers capable of resisting gunshots
5	bullet-resistant armour	e	pads pressed against discs to induce deceleration

b **Read the information from DuPont™ on the following page explaining some of the automotive applications of Kevlar®. Complete the text using the automotive parts in Exercise 9a.**

Car and truck (1) _____ have incorporated Kevlar® into their construction because it offers superb puncture, abrasion and tear resistance.

The high modulus and abrasion resistance of Kevlar® help (2) _____ retain their original shape and tension over the millions of revolutions they go through over the lifespan of a vehicle.

The frictional forces that (3) _____ are designed to endure take less of a toll on those made with Kevlar® pulp. The enhanced thermal stability and inherent abrasion resistance of Kevlar® allow them to last long and stop the vehicle safely and quickly.

Kevlar® provides an effective, lightweight (4) _____ solution for vehicles that require protection against ballistic attack, allowing cars and light trucks to retain most of their original handling characteristics.

Chemical stability and thermal stability help make (5) _____ reinforced with Kevlar® pulp strong and durable. The galvanic corrosion resistance of Kevlar® also contributes to improved long-term engine performance.

c **In pairs, discuss why the properties of Kevlar® are especially important for each application described in the text.**

a ▶2.4 **Listen to a conversation about the properties of materials used in a specific type of tool and answer the following questions.**

1 Where does the conversation take place?
2 What tool is being discussed?
3 Which materials can be used for its different parts?

b **Complete the following extracts from the conversation using the properties in Exercise 8c. Listen again and check your answers.**

1 The handle mustn't be heavy. *Ideally, you want it to be* _____.
2 Resisting friction is essential. *The key requirement is* _____ _____.
3 The bur has to be built to last. *Obviously, they need to be very* _____.
4 Heat builds up in the bur. *You need a good degree of* _____ _____.

c **Match the words and phrases (1–5) from Exercise 10b to the synonyms (a–e).**

1	ideally	a	it's clear that
2	obviously	b	for the best results
3	the last thing you want	c	the most important factor
4	the key requirement	d	a lot of / a high level of
5	a good degree of	e	the worst situation

a **You work for a manufacturer of hand tools and have been asked to investigate using alternative materials in your products. In pairs, read the notes and discuss the main properties required of the materials used to make the tools.**

Hammers a) Joiners' hammers (for nails)
b) Lump hammers (for masonry chisels)
Consider the hammer head and the hammer shaft.

Saws a) Wood saws (for cutting wood)
b) Hacksaws (for cutting metal)
Consider the saw blade and the saw handle or frame.

b **Think of a product you know well. In pairs, discuss the materials used in it and what properties make the materials suitable. Discuss whether alternative materials could be used.**

Discussing quality issues

12 **In pairs, answer the following questions.**

1 In advertising, what hi-tech, high-performance situations are often used to promote watches?
2 What messages are they intended to send about the quality of products?
3 What quality issues differentiate higher-quality watches from lower-quality ones?
4 What is the difference between describing something as water-resistant and waterproof?

13 a ▶2.5 **Louisa, a marketing executive for a watch manufacturer, is discussing material selection with Tom, one of her engineering colleagues. Listen to the discussion and complete the four quality issues that are mentioned in the meeting.**

1 _____ resistance
2 _____ resistance
3 _____ resistance
4 _____ resistance

b **In pairs, discuss what is meant by each of the quality issues in Exercise 13a.**

14 a ▶2.5 **Listen again and answer the following questions.**

1 What point does Tom make about the reasons for selecting materials?
2 What does he say about submarine-grade steel to exemplify the above point?
3 What problem does he describe with regard to the marketability of many materials?
4 What hard commercial fact does Louisa give?

b **In pairs, mark the following statements True (T) or False (F) according to the views expressed in the conversation. Read the audioscript on page 87 and check your answers.**

1 Often, exotic-sounding materials are not that suitable, technically.
2 People think that a submarine steel watch must be tremendously water-resistant.
3 The corrosion resistance of submarine steel is exceptionally good.
4 Submarine-grade steel looks fairly good.
5 Tom thinks submarine steel is particularly suitable for watches.
6 The firm has often used materials that are not adequately durable.
7 Often, the compositions of good watch materials are relatively complex.
8 Materials with complicated names are pretty good for marketing.

c ▶2.6 **Listen to the following phrases from the conversation and underline the stressed syllable. Practise saying the phrases.**

1 not particularly suitable
2 exceptionally resistant
3 not at all suitable
4 tremendously marketable
5 relatively complex
6 not all that good

d **Complete the following table using the words in the box.**

~~exceptionally~~ fairly insufficiently not adequately not (all) that
not particularly pretty relatively tremendously

extremely	quite	not very	not enough	definitely not
exceptionally	_____	_____	_____	_____
_____	_____	_____	_____	
	_____			

15 **In pairs, discuss the key properties and different types and grades of the following materials. Give examples of the properties that make each material good or bad for watch-making, from a quality perspective.**

Materials
steel glass aluminium titanium gold plastic copper rubber

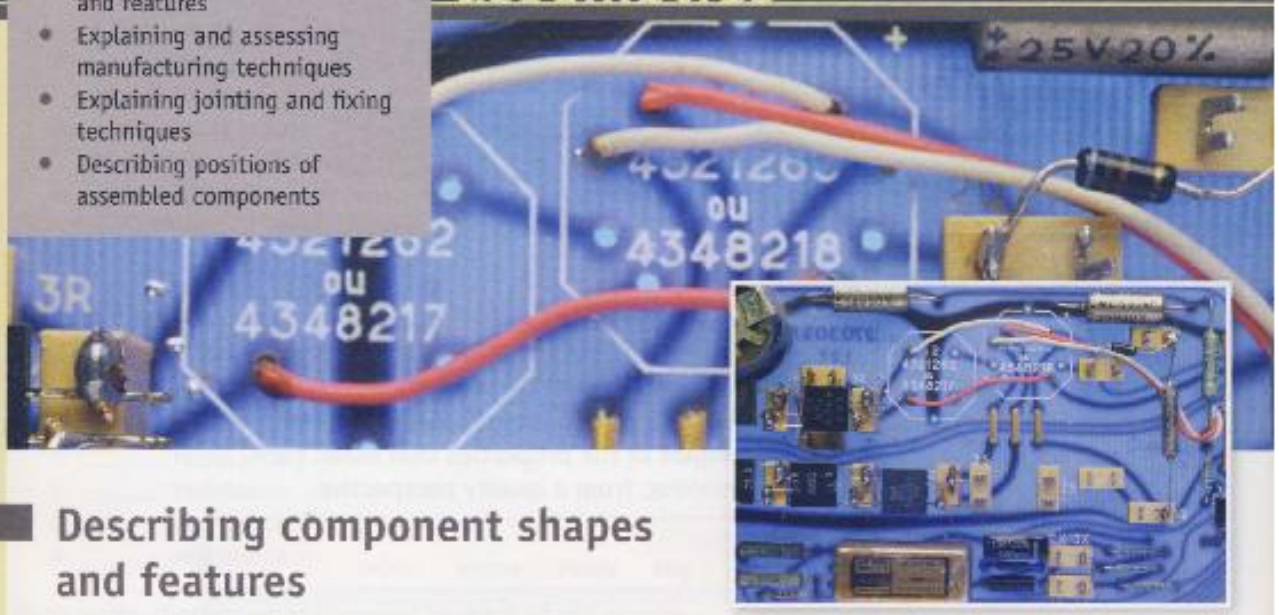
Properties
water-resistant abrasion-resistant corrosion-resistant shock-resistant tough
brittle elastic durable heavy lightweight thermally stable

16 **In small groups, choose a well-known consumer product or appliance and discuss it from a quality perspective. How suitable are the materials used? How good is the product, compared with others sold by competitors?**

UNIT 3

Components and assemblies

- Describing component shapes and features
- Explaining and assessing manufacturing techniques
- Explaining jointing and fixing techniques
- Describing positions of assembled components



Describing component shapes and features

1 What do you know about the electrical plugs and sockets used in different countries? In pairs, describe some specific designs.

2 a ▶3.1 Jan, a project manager for a firm that manufactures electrical plugs and sockets, is briefing some of his engineering colleagues. Listen to the briefing and summarise the aim of the project.

b In pairs, discuss what is meant by *profile of the pins* and *standard configuration*.

c ▶3.2 Erin, an engineer with the same company, is describing different electrical plug and socket formats during the briefing. Listen and match the descriptions (1–6) to the pictures (a–f).

a _____

b _____

c _____

d _____

e _____

f _____

d **Complete the following phrases from the descriptions using adjectives based on the words in brackets.**

1 *... there are* circular *pins for live and neutral.* (circle)
2 *... the earth slot's got a flat base with one side* _____ *over to form a semi-circle.* (round)
3 *This one has* _____ *blades for live, neutral and earth ...* (rectangle)
4 *... it has a* _____ *slot to receive the earth pin.* (cylinder)
5 *... the pins are arranged in* _____ *configuration.* (line)
6 *... they're laid out in* _____ *configuration.* (triangle)

e ▶3.3 **Listen and underline the stressed syllable in each of the following words.**

rectangle	rectangular	triangle	triangular
cylinder	cylindrical	line	linear

3 **a** ▶3.4 **Listen to a longer description from the meeting. Which picture (a–f) in Exercise 2c does Erin describe?**

b **Complete the following extracts from the description using the correct form of the words in the box.**

flush with	groove	~~hole~~	pin	recess	ridge	set back

1 *... there's a circular slot at the top. It's obviously a blind* hole *, it doesn't go right through.*
2 *... there are two plastic* _____ *, one on either side of the plug casing, and they slot into corresponding* _____ *at each side of the socket. In addition, the centre of the socket is* _____ *. So rather than being* _____ *the front of the socket, on the same face, the circular area that receives the plug is* _____ *from the surrounding casing ...*
3 *These covers only open when pressure is applied to both by the two* _____ *of the plug simultaneously.*

c **In pairs, describe the different plug and socket formats in the pictures in Exercise 2c.**

4 **a** ▶3.5 **Andy and Karin, two electrical engineers, are evaluating a plug and socket format in Exercise 2c. Listen to the conversation and make notes of the advantages and disadvantages of the following features.**

1 Plug slots into a recess in the socket:
Advantages _____
Disadvantages _____
2 Covers protect live and neutral slots:
Advantages _____
Disadvantages _____

b **In pairs, discuss the advantages and disadvantages of the plug and socket formats in Exercise 2c. Use the following phrases from the conversation.**

an advantage/disadvantage of this format is ... another advantage/disadvantage is ...
the problem with this system is ... this (shape/format/feature) stops ... from ... -ing
this (shape/format/feature) allows it to / helps it to / makes it easy to / makes it difficult to ...

Explaining and assessing manufacturing techniques

5 **In pairs, think of some examples of machining operations that are often used in manufacturing involving metalworking.**

6 a ▶3.6 **Evan, a sales engineer with a metal fabrication company, is showing Mr Barrett, a new customer, around their plant. Listen to the conversation and mark the statements True (T) or False (F).**

1 The company specialises in sheet metal working.
2 The company does a lot of metal casting.
3 Metal bashing is a precise technical term for hammering.
4 Drills and milling machines are always noisy.
5 Grinding is a process that uses abrasives.
6 The press is used for shearing metal.

b **Complete the following training material for graduate engineers using the words in the box.**

Drilling Flame-cutting Milling Sawing Shearing

MANUFACTURING TECHNIQUE EVALUATION: CUTTING OPERATIONS

Key factors in determining the most appropriate cutting technique are: material characteristics (notably hardness, and thermal and electrical properties), component thickness, component shape and complexity, required edge quality, and production volume. Select cutting options below for a detailed analysis of techniques.

CUTTING OPTIONS

(1) _____ : abrasive cutting, removing a kerf of material. Includes cutting with toothed blades and abrasive wheels. More...

(2) _____ : use of pressure on smooth-edged blades for guillotining and punching. More...

(3) _____ : removal of material across the full diameter of a hole, or using hole-saws for cutting circumferential kerfs. More...

(4) _____ : removal of surface layers with multiple cutting wheel passes. More...

(5) _____ : using oxy fuel (oxygen + combustible gas, often acetylene). More...

c **Complete the following definitions using the words in the box.**

abrasive wheel guillotine hole-saw kerf punch toothed blade

1 A punch makes holes by applying pressure to shear the material.
2 A _____ makes straight cuts by applying pressure to shear the material.
3 A _____ is the width of the saw cut.
4 A _____ has sharp edges for cutting or milling.
5 A _____ has a hard, rough surface for cutting or grinding.
6 A _____ cuts a circular piece to remove an intact core of material.

7 a **Read the following extract of promotional literature from a leading producer of ultra-high-pressure (UHP) waterjet cutting machines. In pairs, explain the phrases in bold.**

Flow

What makes waterjets such a popular cutting option? Water jets require few **secondary operations**, produce **net-shaped parts** with no **heat-affected zone**, heat distortion, or **mechanical stresses** caused by other cutting methods, can cut with a **narrow kerf**, and can provide better usage of raw material since parts can be **tightly nested**. As a result of the FlowMaster™ PC control system and intuitive operation, waterjets are extremely easy to use. Typically, operators can be trained in hours and are producing high-quality parts in hours. Additionally, waterjets can cut virtually any material, leaving a satin-smooth edge.

b ▶3.7 **Evan is talking to Mr Barrett about UHP waterjet cutting. Listen to the conversation and match the phrases in the box to the extracts (1–4).**

heat-affected zone mechanical stresses narrow kerf net-shaped parts

Extract 1 _____ Extract 3 _____

Extract 2 _____ Extract 4 _____

c **Complete the following extracts from the conversation by underlining the correct phrases.**

1 *So they are* ***especially good when / not so good when*** *you have intricate shapes.*
2 *Saw blades are obviously* ***perfect when / useless when*** *you're cutting curved shapes.*
3 *... sawing is* ***the ideal solution / not the best solution*** *if you want to avoid altering the material.*
4 *... it's* ***ideal for / totally unsuitable for*** *metals.*

8 **In pairs, assess the different cutting techniques in terms of**
- **shape/size of cut**
- **material types/characteristics**
- **cut width/quality.**

Use the phrases in the box.

ideal/perfect/especially good for + -ing the ideal/perfect solution for
not particularly suitable / not so good if you need ...
not the best solution if you don't want ... totally unsuitable / useless

Cutting techniques
drilling with a bit
drilling with a hole-saw
flame-cutting
grinding
guillotining
milling
punching
sawing
waterjet cutting

Shape/size of cut
angular blind holes curved large small straight
thick thin through holes

Material types/characteristics
ceramics metals plastics timber hard tough
brittle

Cut width/quality
heat-affected zone narrow kerfs no kerf rough edges
smooth edges wide kerfs

Explaining jointing and fixing techniques

9 In pairs, think of some examples of ways of joining materials together.

10 a ▶3.8 Pedro, a purchasing manager with a kitchen appliance manufacturer, is talking to Alicia, a sales manager from one of their main suppliers. Listen to the conversation and answer the following questions.

1 What objective does Pedro describe regarding his company's relationship with suppliers?
2 What is Alicia concerned about?
3 How does he respond to her concerns?

b Complete the following table using the words in the box.

adhesive ~~bolt~~ clip rivet screw weld

Mechanical fixings	Non-mechanical fixings
bolt	

c Label the photos (1–6) with the words in Exercise 10b.

1 weld

2 _____

3 _____

4 _____

5 _____

6 _____

d Match the types of connection in the box to the following groups.

bolting bonding connecting fixing gluing joining riveting welding

1 connecting _____ _____ = describes any kind of connection.
2 _____ _____ – describes mechanical connections only.
3 _____ _____ _____ = describes non-mechanical connections only.

11 **a** **Complete the following questions using the words in the box.**

each other on onto to together

1 How can we fix these two components _____ ?
2 How can we fix these two components to _____ ?
3 How can we fix this component _____ ?
4 How can we fix this component _____ / _____ this component?

b **Complete the following training web page using the words in Exercise 11a.**

MANUFACTURING TECHNIQUE EVALUATION: JOINTS AND FIXINGS

The most suitable method of joining components depends on many factors, which extend beyond the obvious issue of required strength.

- Will the joint need to be disconnected in the future? If a part is bolted (1) _____ , it can obviously be removed at a later date. If two components are bonded to (2) _____ with strong adhesive, or welded (3) _____ then subsequent removal will clearly be more difficult. More...
- What external factors might affect the joint? Water or heat can weaken adhesive joints. And no matter how tightly nuts are screwed (4) _____ bolts, vibration can cause them to work loose over time. More...
- How quality-sensitive is the jointing technique? Components are rarely joined (5) _____ each other in ideal conditions. Inadequately tightened fixings, improperly prepared surfaces, or flawed welds are inevitable. How could such imperfections affect the joint negatively? More...

c **In pairs, answer the following questions using the information on the web page in Exercise 11b.**

1 What are the main advantage and disadvantage of mechanical fixings?
2 What is the main disadvantage of non-mechanical jointing?
3 What issues can negatively affect mechanical fixings and non-mechanical joints?

12 **a** **In pairs, discuss the following jointing techniques used in aircraft and say how the parts are fixed together.**

1 Early aircraft: timber frame / adhesive or screws
2 Modern jet aircraft: alloy body panels / rivets
3 Aircraft cabins: seats/floor/bolts
4 Aircraft cockpit: windshield/fuselage/adhesive

b **Your company has launched a competition for its engineers to build a homemade model glider that is as cheap as possible to assemble. In pairs, discuss what types of materials and joints you could use.**

Describing positions of assembled components

13 a **In pairs, read the title of the article and suggest ways of making a garden chair fly. Discuss any potential problems.**

b **Read the article and match the questions (a–d) to the paragraphs (1–4).**

a How did the actual flight differ from the one that was planned? ____
b What incidents occurred just before and just after the landing? ____
c What is said about the modern equivalent of this type of activity? ____
d What components were used to assemble the flying machine? ____

CRAZY BUT TRUE: LARRY WALTERS AND THE FLYING GARDEN CHAIR

1 On July 2, 1982, a Californian truck driver named Larry Walters sat outside his house on a garden chair. To say that he was out to get some air is an understatement, for projecting above him a cluster of ropes was tied to 42 helium-filled weather balloons. Anchor ropes, situated underneath the chair, were fastened around the bumper of his car, which was positioned just below the makeshift flying machine.

2 Mr Walters intended to climb gently to an altitude of a few hundred feet, before drifting slowly out of town and across country. He then planned to use an airgun to shoot some balloons and descend gradually to earth. But as the helium gas contained within the balloons warmed up in the summer sun, it progressively generated more lift. When the anchor ropes were released, the self-assembly airship shot up like a rocket. Too shocked to reach for the pistol inserted in his pocket, the first-time pilot held on for life. In just a few minutes, Larry Walters was 16,000 feet above the ground, floating over the city of Long Beach. A short time later, there were further complications; he suddenly found himself inside controlled airspace, adjacent to Long Beach Airport. The occupants of passing Delta Airlines and TWA aircraft looked on at the curious spectacle outside, as wide-eyed as the garden chair pilot hovering beside them.

3 Eventually, after managing to shoot some balloons, Mr Walters descended safely to earth despite an anchor rope, which was still suspended beneath the chair, getting tangled with a power line located alongside the landing site (in someone's garden). He was immediately arrested by waiting police officers, and was later fined for breaking Federal aviation laws.

4 Today, cluster ballooning, while still a fairly marginal sport, is steadily starting to gain in popularity.

c **Answer the questions in Exercise 13b.**

14 a **Label the diagrams using the prepositions in the box.**

~~above~~ adjacent to alongside around below beneath beside inside outside over underneath within

a above

c

e

b

d

f

b **Complete the following sentences about the flying garden chair using the prepositions in the box. Check your answers against the text in Exercise 13b.**

in	above	around	beneath	within

1 Projecting _____ the chair was a cluster of ropes, tied to 42 helium-filled weather balloons.
2 Anchor ropes were fastened _____ the bumper of the car.
3 Larry Walters had an airgun inserted _____ his pocket.
4 The helium contained _____ the balloons warmed up in the sun.
5 After takeoff, the anchor ropes remained suspended _____ the chair.

c **Complete the following descriptions of how the garden chair airship was assembled by underlining the correct words.**

1 A quantity of helium gas was **contained/suspended** inside each balloon.
2 A tube was **inserted/projected** inside the openings of the balloons, to inflate them.
3 The balloons were **situated/suspended** over the chair, in a large cluster.
4 The chair was **contained/suspended** under the balloons by ropes.
5 Arm rests, **contained/located** beside the pilot, at each side, helped to hold him in place.
6 The landing gear, **inserting/projecting** below the seat, consisted, simply, of the chair legs.
7 The pilot was **positioned/projected** underneath the balloons, so his weight was low down.

d **Which two other words have the same meaning as *positioned*?**

contained	fastened	inserted	located	projected	situated	suspended

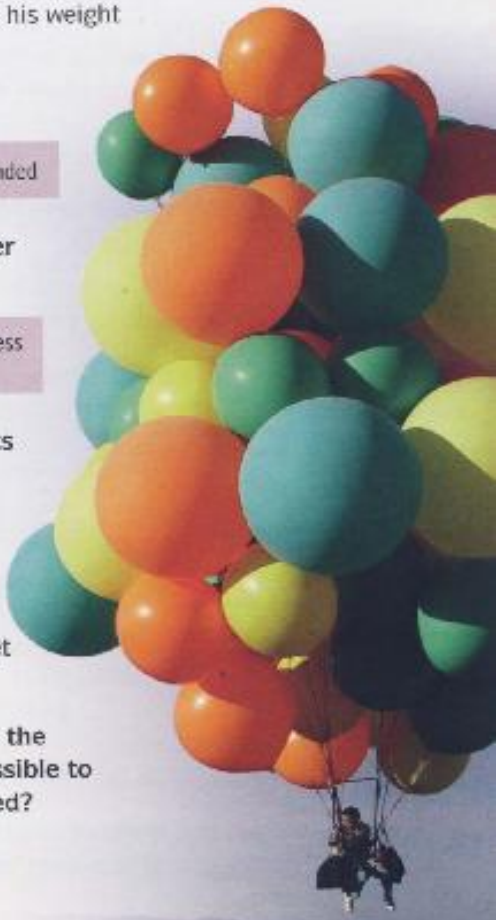
15 **a** **In pairs, look at the photo and describe how you think the cluster balloon is assembled from the following components.**

bags	balloons	helium	nylon ropes	nylon straps	paragliding harness
plastic cable	sand/water ballast	ties	tape		

b ▶3.9 **Eva and Lenny, two engineers working for an extreme sports equipment manufacturer, are discussing cluster ballooning. Listen to the conversation and summarise what they say about the following issues.**

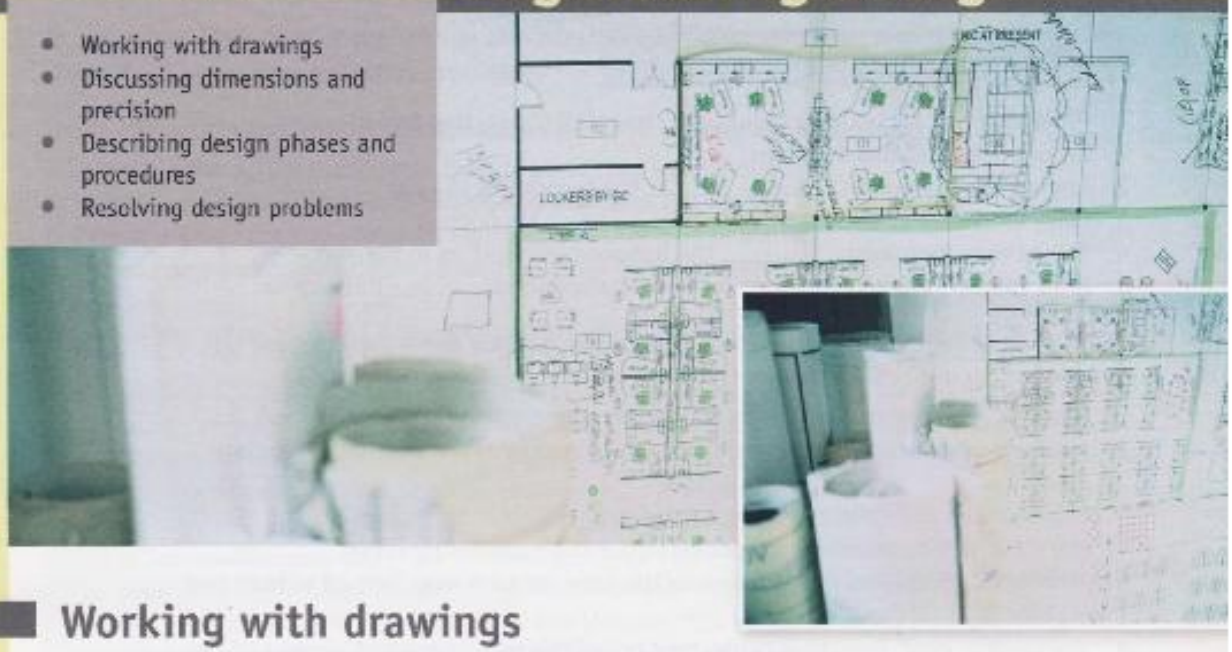
1 assembly time
2 how plastic cable ties are used
3 a tree structure
4 how water bags are used
5 the advantage of tying each individual balloon
6 the problem of using a net to contain the balloons

c **In pairs, discuss ways of overcoming the problems mentioned in the conversation. How could cluster ballooning be made more accessible to a mass market? What other equipment/assemblies could be used?**



UNIT 4 Engineering design

- Working with drawings
- Discussing dimensions and precision
- Describing design phases and procedures
- Resolving design problems



Working with drawings

1 **In pairs, discuss the different types of design information needed on a complex engineering project, such as the construction of a large cruise ship. How many different drawings do you think might be produced for such a project? How would they be organised and categorised?**

2 a ▶4.1 **Joe, a technician at a shipyard, is talking to Linda, one of his engineering colleagues in the design office. He is asking about some information which he can't find on any of the drawings. Listen to the conversation and answer the following questions.**

1 What area of the ship are they discussing?
2 What does the technician need to know?

b **Complete the following definitions using the types of drawing in the box.**

cross-section	elevation	exploded view	note	~~plan~~	schematic	specification

1 A plan gives a view of the whole deck, from above.
2 An _____ gives a view of all the panels, from the front.
3 An _____ gives a deconstructed view of how the panels are fixed together.
4 A _____ gives a cutaway view of the joint between two panels.
5 A _____ gives a simplified representation of a network of air ducts.
6 A _____ gives a brief description or a reference to another related drawing.
7 A _____ gives detailed written technical descriptions of the panels.

c **Which two types of drawing in Exercise 2b are examples of general arrangement drawings, and which two are examples of detail drawings?**

d **Read the following technical questions that came up during the shipbuilding project and decide which type of drawing is required to answer each question.**

1 How many panels are there altogether on this wall? _____
2 What profile are these hollow beams: rectangular or circular? _____
3 What are the positions of all the floodlights around the deck perimeter? _____
4 How many branches come off the main sprinkler supply pipe? _____
5 How do all the internal components of the fan unit fit together? _____

3 **a** **What is meant by *scale* on a drawing? In pairs, explain how a scale rule, like the one shown in the picture, is used.**

b ▶4.2 **After receiving the drawings for the panels, Joe is now discussing some details with Pavel, a colleague. Listen to the conversation and answer the following questions.**

1 What piece of information is not shown on the drawing?
2 What *golden rule* is mentioned?

c **Complete the following extracts from the conversation and explain what is meant by each one.**

1 *Is this drawing _____ scale?*
2 *It's one _____ five.*
3 *... you shouldn't scale _____ drawings ...*
4 *... it's actual size, on a _____ scale drawing ...*

4 **You are engineers on a project to design the metal handrail that will run around the perimeter of the top, outdoor deck of a large cruise ship. In pairs, discuss what drawings you will need to produce for manufacturing and installation with regard to the following issues:**

- the types of view that will be required and what each one will show
- the approximate scale of different drawings and views
- what written information you will need to provide in the specification.

5 **You are going to provide design information to enable a production team to manufacture a product or appliance you know well. Make a list of some of the drawings that will be needed, noting what each one will show.**

Discussing dimensions and precision

6 a **In pairs, discuss what is meant by *precision* and *accuracy*.**

b **Read the technical advice web page and answer the following questions.**

1 How is a superflat floor different from an ordinary concrete floor?
2 What accuracy can be achieved with ordinary slabs, and with superflat slabs?
3 What problem is described in high bay warehouses?

Superflat Floors: FAQ

What is a superflat floor?

Compacting and finishing the surface of wet concrete is an inherently imprecise process. For an ordinary concrete slab to be laid within tolerance, engineers can only realistically expect the surface to be finished to plus or minus 5mm. By contrast, superflat concrete floors are finished to meet extremely close tolerances, being accurate to within 1mm across their upper surface.

Where are superflat floors used?

Floor surfaces with extremely tight tolerances are frequently specified in warehouses where Automated Guided Vehicles operate. Uneven floors are especially problematic in high bay warehouses, which use automated forklifts with a vertical reach of 30 metres or more. At such a height, slight variations in floor level are amplified in the form of vertical tilt, causing inaccurate manoeuvring at high level. If these variations are outside tolerance they can lead to collisions with racking elements, or cause items to be dropped from pallets.

c **In pairs, discuss what is meant by *tolerance* in the context of dimensions and precision.**

d **Complete the following expressions from the web page which are used to describe tolerances.**

1 _____ tolerance (inside the limits of a given tolerance)
2 _____ or _____ 5mm (+/−5mm)
3 _____ tolerance (close tolerance)
4 _____ tolerance (not inside the limits of tolerance)

e **Complete the following sentences using the expressions in Exercise 6d.**

1 The frame's too big for the opening. The opening's the right size, so the frame must be _____.
2 The total tolerance is 1mm. The permissible variation either side of the ideal is _____.
3 The engineer specified +/−5mm for the slab finish, and we got it to +/−2mm. So it's well _____.
4 You can't finish concrete to +/−0.1mm. There's no way you can work to such a _____.

f **In some situations, engineers describe tolerances using *plus or minus*, for example *+/− 1mm*, and in other situations as *within*, for example *within 1mm*. In pairs, discuss the difference in meaning between these two descriptions, giving examples of situations where each description might be used.**

7 a ▶4.3 **Mei, a structural engineer, is talking to Lewis, a project manager, about the floor specification for a manufacturing plant that is currently at design stage. Listen to the conversation and answer the following questions.**

1 What has the client requested with regard to the floor slab?
2 What are free movement floors and defined movement floors?
3 What issue does the engineer discuss regarding quality?
4 What option is discussed involving grinding?
5 What can be done to the reinforcement to permit grinding?

b **Complete the following table using the words in the text in Exercise 6b and audioscript 4.3 on page 89.**

	Name of dimension	Large dimension	Small dimension
1	What's the _____?	Is it _____?	Is it short?
2	What's the width?	Is it _____?	Is it narrow?
3	What's the _____?	Is it high?	Is it low?
4	What's the thickness?	Is it _____?	Is it thin?
5	What's the _____?	Is it deep?	Is it shallow?

c **Mei has done a revised drawing for the floor slab. Read the extract from her email about the new design and complete the message using the correct form of the words in Exercise 7b.**

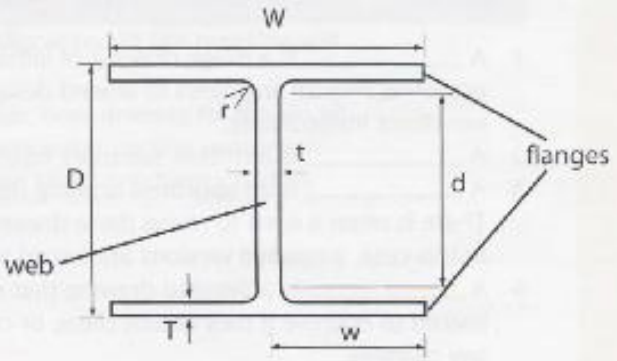
To: Lewis Rosas
Subject: Revised floor slab drawing

Please find attached a revised drawing for the floor slab, now reconfigured for defined movement. In order to accommodate guided vehicles 1 080mm (1) wide (as specified by the client) we propose a standard (2) _____ of 1 280mm for each superflat lane. At 14.5m, the (3) _____ of the longest lane on the network is within the maximum slab run that can be cast in a single concrete pour, thus avoiding construction joints on straight runs. On curved sections, a standard 8.5m turning radius is used, as per the guided vehicle manufacturer's recommendations.

In order to allow for the eventuality of future grinding, we have located the top layer of reinforcement 10mm deeper below the slab surface. This additional (4) _____ has not, however, been added to the overall slab (5) _____, which remains 275mm. The reinforcing bars also remain in 12mm diameter. As a result, the levels of wall-mounted process installations – many of which need to be fixed at a precise (6) _____ above finished floor level – are unaffected.

d **Which two words in the email relate to circles? What aspects of a circle do they describe?**

8 **The manufacturing plant in Exercise 7 will be built from a steel frame. The vertical elements of the frame will be Universal Columns (UCs). Look at the section of a UC. In pairs, describe the different dimensions that define a UC profile by explaining what the letters on the section refer to.**



Describing design phases and procedures

9 **In pairs, discuss what is meant by a *design process*. In engineering, what are the stages in the development of designs?**

10 a **The following extracts from emails relate to a project to build an indoor ski complex in Australia, using artificial snow. The messages were circulated by an engineer to members of the design team, and to a specialist contractor. Read the emails and, in pairs, answer the following questions. Note that the emails are not in the correct order.**

1 What are all the emails about?
2 What different types of documents are mentioned?

a

We now have a full set of working drawings for the main ski lift (attached). These incorporate some amendments requested by the client, which have now been approved. Hard copies have been forwarded to the relevant contractors' premises, for fabrication.

b

I attach a summary of our meeting with the client last Tuesday. It outlines ideas expressed by the client's marketing team, and describes what an experience at the ski complex should be like, from a visitor's point of view. We'll be going through these notes at the project kick-off meeting next Thursday, to clarify the design brief, so please formulate any queries before then.

c

Please find attached a full set of preliminary drawings, as submitted to the client for approval / comments. These are for information only at this stage.

d

Attached are a few rough sketches setting out the overall layout of the ski complex. At this point, these are initial ideas based on the client's suggestions and the approximate dimensions specified in the design brief. I look forward to any feedback by the end of this week.

e

Please note that dwg 18A is currently being revised, to resolve problems encountered during assembly of the ski lift. Revision B will be circulated next week. Until the amended drawing is issued, please treat dwg 18A as superseded. If you require specific details urgently, please contact me, and I will arrange for a suitable sketch to be issued.

b **Put the emails in the correct sequence.**

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

c **Complete the following definitions using the types of drawing in the box.**

design brief preliminary drawing sketch working drawing

1 A _____ is a rough drawing of initial ideas, also used when production problems require engineers to amend design details and issue them to the workforce immediately.
2 A _____ is a written summary intended to specify design objectives.
3 A _____ is an approved drawing used for manufacturing or installation. There is often a need to revise these drawings to resolve production problems. In this case, amended versions are issued to supercede the previous ones.
4 A _____ is a detailed drawing that colleagues and consultants are invited to approve if they accept them, or comment on if they wish to request any changes.

d **Find synonyms for the following words in the definitions in Exercise 10c.**

1 accept / approve
2 amend / _____
3 approximate / _____
4 circulate / _____
5 give feedback / _____
6 replace / update / _____
7 state / _____
8 solve / _____

e **In pairs, suggest what needs to be done next in each of the following situations.**

1 They've found a problem with drawing 63 on site. The detail we've specified doesn't work.
2 I've done a preliminary design for the duct layout, but the client hasn't seen it yet.
3 I've got a feeling the drawing they have on site isn't the latest one.
4 We've just revised drawing 14. The changes are going to affect three different contractors.
5 This is the client's written design brief. How shall we kick off the design work?

11 **a** **Leo is the ski complex project manager. With design work about to begin, he is meeting senior engineers from the design teams to discuss design coordination. In pairs, explain the items on the meeting agenda and suggest what kinds of issue might be discussed.**

Australian Ski complex – Design Coordination Meeting Agenda
Tuesday 8th May
Conference room 9.30am – 11.00am
To: RN, LG, SB, CW, SH

Item

a Design interface (mechanical, electrical)
b Design and information flow procedure (structural, mechanical, electrical)
c Inter-team communication – formal and informal

b ▶4.4 **Listen to three extracts from the meeting and match each extract (1–3) to an agenda item (a–c).**

1 _____ 2 _____ 3 _____

c ▶4.4 **Listen again and make notes about the problems discussed in the meeting. In pairs, discuss some possible solutions to the problems.**

d ▶4.5 **Listen to Leo summarising the solutions that have been agreed in the meeting. What has been decided regarding the following points?**

1 The decision that the senior engineer in each team must make, regarding drawings
2 The circulation procedure that will be used for each drawing
3 The role of the M&E coordinator in relation to the senior engineers and the project manager
4 The arrangement that will make informal communication easier

e **In pairs, discuss how the design procedures discussed in the meeting will work in the following situations.**

1 Issuing the first draft of a specialised hydraulic hose drawing for the ski lift
2 Designing an electrical supply system for some water-cooling equipment
3 Revising the connection details between some ski-lift machinery and its concrete foundation

Resolving design problems

12 **In pairs, discuss problems that can arise when different drawings that make up a design are not properly coordinated.**

13 a **The following records are from the indoor ski complex project. They show correspondence between the design team and construction team. Read through the texts quickly and answer the following questions.**

1 What is the general subject of the correspondence?
2 What is meant by *query* and *instruction*?
3 Some queries refer to earlier conversations. Suggest why these have been followed up in writing.
4 What is meant by *dwg* and *dims*?

CONTRACTOR'S QUERY No. 867	ENGINEER'S INSTRUCTION
Following our telephone conversation today, we note that there is a discrepancy between dwgs 76E and 78E, which indicate conflicting dimensions for the width of the roof opening. Please clarify which dimension is correct.	We confirm the correct dimension is on dwg 76E. Please disregard the dims on dwg 78E.
CONTRACTOR'S QUERY No. 868	ENGINEER'S INSTRUCTION
As discussed this morning on site, we confirm there is a clash between the proposed cable tray (dwg E56) and air-conditioning ductwork (now installed as per dwg M118) in the ceiling void at Grid D14. Please advise on an alternative cable route.	Please work to attached sketch S33. Revision of dwg E56 to follow.
CONTRACTOR'S QUERY No. 869	ENGINEER'S INSTRUCTION
A note on dwg 11A specifies black bolts at the base of the ski lift cable support. This contradicts the specification, which states that all joints to comprise High Strength Friction Grip bolts. We propose using HSFG fixings at this location.	Please provide further details of the HSFG bolts you are proposing.
CONTRACTOR'S QUERY No. 870	ENGINEER'S INSTRUCTION
Further to Query 869, the proposed HSFG bolts are as per those specified for all other bolted joints on the ski lift supports. Our intention is to use a single bolt spec to facilitate assembly.	Approved.

b **Read the correspondence in detail. Write the query numbers in Exercise 13a next to the descriptions (1–5). You will need to refer to some queries more than once.**

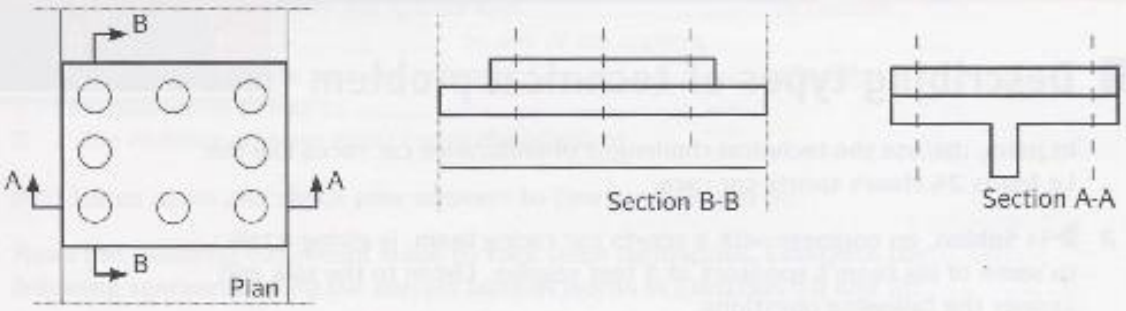
1 An installation that won't fit, as components are in each other's way 868
2 A response from the engineer asking for more information _____
3 Queries that suggest a solution, which will require the engineer's approval _____ _____
4 Requests to the engineer to instruct the contractor or make something clear. _____ _____
5 Separate documents referring to details that don't correspond with each other _____ _____ _____

c **Complete the following pairs of sentences using the verbs in the box.**

advise clarify clash propose request

1 The components are in each other's way. = The components _____ .
2 Please ask for more information. = Please _____ more information.
3 Can I suggest a solution to the problem? = Can I _____ a solution?
4 Please instruct the supplier to send the parts to this address. = Please _____ the supplier.
5 Any conflicting details must be queried. = You must _____ any conflicting details.

4 a **In pairs, look at the following plan and sections from a drawing on the ski complex project, showing steelwork details on part of a ski lift. Examine how the rectangular plate is bolted to the T profile below it. Can you find the discrepancy between the details, and the clash preventing the connection from being assembled?**



b **Chen, a technician, is explaining the problem in Exercise 14a to Ron, an engineer. Complete the conversation using the words in the box.**

alternative as per clarify clash confirm contradicts ~~discrepancy~~ propose

Chen: *There's a (1)* discrepancy *between these details that you might be able to (2) _____ straight away. On the plan of this plate, it shows eight bolts. But on section A, here, there are no bolts shown in the middle. So there would only be six, which obviously (3) _____ the plan. But as you can see, this plate's going to be bolted to a T profile. So we couldn't put a row of bolts down the middle, because they'd (4) _____ with the flange running along the middle of the T. So I'd (5) _____ just going for two rows of bolts. The (6) _____ would be to redesign the T section, which would obviously be a bigger job.*

Ron: *Yes. Let's go for two rows of bolts, (7) _____ the sections.*

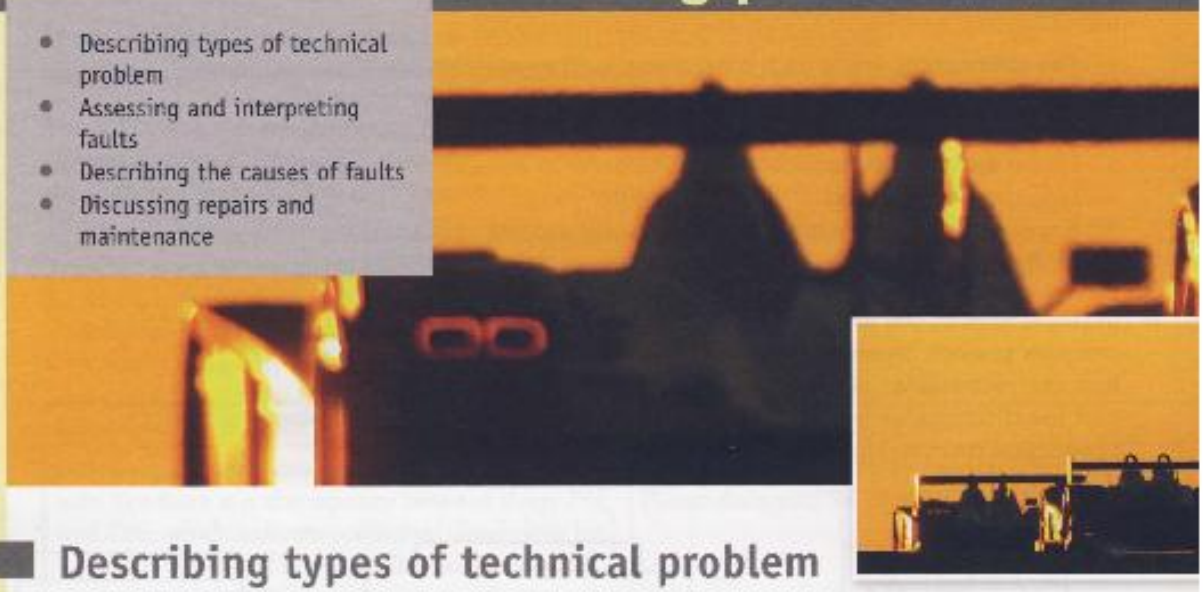
Chen: *OK, fine. Will you send an email to (8) _____ that?*

c ▶4.6 **Listen to the conversation and check your answers to Exercise 14b. How does the explanation compare with your description of the problem?**

d **Write an email from Ron to Chen, confirming the revision agreed in the discussion above.**

UNIT 5 Breaking point

- Describing types of technical problem
- Assessing and interpreting faults
- Describing the causes of faults
- Discussing repairs and maintenance



Describing types of technical problem

1 **In pairs, discuss the technical challenges of endurance car races like the Le Mans 24 Hours sports car race.**

2 a ▶5.1 **Sabino, an engineer with a sports car racing team, is giving a talk to some of his team's sponsors at a test session. Listen to the talk and answer the following questions.**

1 What saying emphasises the importance of reliability?
2 What expression refers to things that can cause failures?
3 What expression describes damage caused by normal use?

b ▶5.1 **In the talk, Sabino names five engineering enemies. Complete the following list. Listen again and check your answers.**

1 h_____ = high temperatures
2 p_____ = loads from expanding gases or liquids
3 v_____ = continuous high-frequency movement or shaking
4 s_____ = sudden impacts
5 a_____ = damage to surfaces caused by friction

c **In pairs, suggest which engineering enemies in Exercise 2b can be the most problematic for each of the following car parts.**

1 chassis	4 suspension	7 wings
2 engine	5 brakes	8 cooling system
3 gearbox and clutch	6 tyres	9 nuts and bolts

3 a ▶5.2 **Listen to Sabino talking about some technical problems the team have had at the test and mark the following statements True (T) or False (F).**

1 Some liquid was lost from a pipe.
2 A car lost all its coolant with the engine still running.
3 A car's engine stopped on the circuit.
4 Some tyres were damaged.
5 A wheel nut fell off a car on the circuit.
6 A car's suspension was broken.

b **Complete the following extracts from the talk using the words in the box.**

bend	blocking	crack	jam	snap

1 *... you don't want anything* _____ *the airflow to the radiators.*
2 *... they had a wheel nut* _____ *, it wouldn't turn.*
3 *... he didn't hit the barriers and* _____ *the suspension or* _____ *it completely.*
4 *... it didn't* _____ *the tub – the chassis.*

c **Complete more extracts from the talk using the correct form of a verb in box 1 and a word in box 2.**

1						
blow	clog	cut	leak	run	wear	work

2		
~~loose~~	up	out

1 *... a nut* worked loose *on a radiator pipe, which resulted in coolant liquid* _____ _____ .
2 *... he switched off before the system had* _____ _____ *of coolant.*
3 *... the engine* _____ _____ *on one of the corners.*
4 *... the openings in the side pods always* _____ _____ *with dirt.*
5 *The tyres weren't close to* _____ _____ *...*
6 *... the radiator problem didn't cause the engine to* _____ _____ .

d ▶5.2 **Listen again and check your answers to Exercises 3b and 3c.**

e **Read the following comments made by race team technicians. Complete the following sentences using the correct form of words in Exercises 3b and 3c.**

1 There's smoke and flames pouring out of the engine. It's blown up .
2 There's a pool of oil under the car. Something's _____ .
3 This cylinder head bolt won't loosen. It's _____ .
4 The air filter's full of dirt. It's completely _____ .
5 This wing support's been moving about. The bolts have _____ .
6 Something's stopping the oil flow. The pipe might be _____ .
7 Are you sure that pushrod's straight? It looks as if it's _____ .
8 We'll need to change these brake pads. They're nearly _____ .
9 There's hardly any fuel left in the car. In another lap, we'll _____ .

4 **Read the technical facts about the Italian motor racing circuit, Monza, and summarise how the track is different from most others. In pairs, discuss the technical problems that racing cars could have at Monza as a result of the factors described in the text.**

The circuit is characterised by long straights and chicanes. This means the cars' engines are at full throttle for over 75% of the lap, a higher percentage than most other circuits.
The track requires heavier-than-average braking over a given lap, as the cars repeatedly decelerate at the end of some of the world's fastest straights for the slow chicanes.
The chicanes are lined by rugged kerbs. Riding over these hard is crucial for fast laps.
The long straights require small wings for minimum drag. This means lower downforce, resulting in lower grip on corners and under braking, and less stability over bumps.
The main high-speed corners Lesmo 1, Lesmo 2 and Parabolica are all right turns.
Parts of the circuit are surrounded by trees, which means leaves can be blown onto the track.

Assessing and interpreting faults

5 a **In pairs, discuss a technical problem you've experienced with a device, equipment or vehicle. Describe the fault, and how you tried to solve the problem.**

b **Read the training notes for telephone helpline staff working for a manufacturer of mining plant. In pairs, discuss what each point means.**

Problem-solving checklist

1 *User's observations:*
   - *nature of fault*
   - *circumstances of fault*
   - *external factors*
2 *Process of elimination*
3 *Identify the failure*
4 *Determine action and urgency*

6 a ▶53 **Mr Rooney, an engineer at a quarry firm, is talking to Al, a helpline consultant, about a technical problem with a diesel engine. Listen to the conversation and answer the following questions.**

1 What does the warning message say?
2 What external factor is discussed as a possible cause?
3 Why is this possible cause eliminated?
4 In what circumstances does the fault occur?
5 What does the consultant identify as the most likely cause?
6 What action is required, and how urgent is it?

b **Match the words in the box to their synonyms in the sentences (1–7).**

defect defective ~~fault~~ faulty intermittently major minor properly systematically

1 There's a **problem**. fault / _____
2 Perhaps something in the fuel injection system is **wrong**. _____ / _____
3 It's a **serious** problem. _____
4 It's a **slight** problem. _____
5 Is it working **correctly**? _____
6 The problem only occurs **from time to time**. _____
7 The problem doesn't occur **every time**. _____

c **Al made the following notes about three engine problems. Match the faults (1–3) to the possible causes (a–c).**

1 Starter motor sometimes works, sometimes doesn't. Engine is 9 years old.
2 Distribution belt failed. Engine blew. Belt replaced recently - almost new
3 New engine. Runs for 20 mins, then temp. gauge always goes into red, and engine cuts out (safety override)

a Cooling system problem. Fan? Water pump?
b Electrical contact problem. Loose connection?
c Manufacturing defect? Incorrect fitting? Not wear

d **In pairs, describe the problems in Exercise 6c using the following phrases.**

a faulty part a sudden problem a systematic problem an installation problem
an intermittent problem caused by wear and tear It's / It was ... It's / It was probably ...
Perhaps it's / it was ... This is / was a ...

e **Complete the following table using the phrases in the box from the conversation.**

I doubt it's it can't be it could be it might be ~~it must be~~ it sounds like it's

1 It's certainly / it must be	
2 It's probably / _____	
3 It's possibly / _____ / _____	a problem with ...
4 It's probably not / _____	
5 It's certainly not / _____	

f ▶5.3 **Complete the following extracts from the conversation using phrases in Exercise 2e. Listen again and check your answers.**

1 *Obviously,* it must be *some sort of defect in the fuel injection system.*
2 *So* _____ *a software problem.*
3 *... maybe* _____ *a defective sensor.*
4 *Presumably,* _____ *anything too serious.*
5 _____ *water, then, if the fuel went in directly from a delivery.*
6 _____ *a faulty fuel pre-heater.*

7 **a** **In pairs, analyse the problem described below. Underline the words in the box that describe it.**

major minor sudden systematic intermittent

The problem
The driver of a dump truck, which operates in a quarry, has noticed that the truck's diesel engine is slightly down on power. The problem has become progressively worse over several weeks. Apart from the power loss, the engine is performing consistently, with no misfiring and no overheating. The degree of power loss remains constant throughout a given period of use, from starting the engine to turning it off. No increase in fuel consumption has been noted.

b **Read the notes and assess the possible causes of the problem in Exercise 7a using the words in Exercises 6d and 6e.**

Possible causes of the engine problem
- *water in the fuel supply*
- *a lubrication problem*
- *a clogged fuel filter*
- *a blockage in the exhaust system*
- *a compression leak from the piston cylinders*

Describing the causes of faults

8 **Look at the following strategies for preventing and dealing with technical problems in aviation. In pairs, discuss what is meant by the following terms and how they are used by engineers and pilots.**

1 checklists
2 standard procedures
3 back-up installations
4 planned maintenance

9 a **Read the article on the right and answer the following questions.**

1 How did the problem start?
2 What were the initial, unseen consequences?
3 What were the subsequent consequences?

"We have a problem"

The true story of Air Transat Flight 236.

The chain of events began during routine maintenance work on an Air Transat Airbus A330. An incorrect hydraulic pipe was fitted to the right-hand engine. The component was oversized, leaving inadequate clearance with an adjacent fuel line. Subsequently, the two pipes rubbed together, causing the fuel line to wear progressively. The problem went undetected, until the night of August 24, 2001, at 35,000 feet above the Atlantic. With Flight 236 en route from Toronto to Lisbon, carrying 306 people, the fuel line ruptured, resulting in a major leak. Less than two hours later, the aircraft was completely out of fuel, gliding silently through the night sky …

b **Complete the sequence of events that followed the fuel leak on the Airbus A330 using the extracts (a–d).**

04:38 The flight data recorder registered an abnormal increase in fuel consumption. At this stage, however, this slight anomaly was insufficient to cause warning lights to come on to alert the crew to any imminent danger.

04:58 _____

05:33 A warning message came up, alerting the crew to an imbalance between the amount of fuel in each wing tank. Initially, the problem was thought to be an instrument malfunction. But further analysis by the crew revealed that the amount of fuel remaining in the right tank was significantly below the planned quantity.

05:36 _____

05:45 As a precaution, the crew decided to divert to the nearest airport - the Lajes military airbase in the Azores.

06:13 _____

06:26 ENG 2 FAIL appeared, and the left engine cut out. Having completely run out of fuel, and with both engines now down, the Airbus A330 was gliding, descending at 2,000 feet per minute.

06:27 _____

06:46 With the airport in sight, the landing gear was lowered manually. The pilot then performed a series of spectacular zigzag manoeuvres to slow the plane down as much as possible. The aircraft touched down on the runway at 370 km/h – exceeding the standard approach speed by over 100 km/h. The pilot applied emergency braking, causing several tyres to blow out and catch fire. But the plane stopped safely, well before the end of the runway.

a An alarm sounded, a red master warning lit up and the message ENG 1 FAIL came up on the screen. Seconds later, the right engine flamed out, due to insufficient fuel.

b During a routine instrument check, the crew noticed a disproportionate amount of oil had been used by each engine. Oil pressure and temperature readings for each engine were also irregular, but the levels were found to be within acceptable parameters.

c As the aircraft was now powerless and potentially uncontrollable, an emergency ram air turbine was deployed automatically to generate back up electrical power for the fly by wire controls and instruments. However, with the main hydraulics shut down, the flaps and spoilers used to slow the plane before and after landing were inoperable. The co-pilot calculated the plane could remain airborne for 15–20 minutes, and that Lajes airbase was an estimated 20 minutes away.

d The crew decided to take action to correct the anomaly, opening a cross-feed valve to transfer fuel from the left tank to the right tank.

c **Make opposites of the following words using the prefixes in the box.**

ab-	dis-	im-	in- (x4)	ir-	mal-	over-	un-

1 correct incorrect
2 undersized _____
3 adequate _____
4 detected _____
5 normal _____
6 sufficient _____
7 proportionate _____
8 regular _____
9 balance _____
10 function _____
11 operable _____

d **Complete the following sentences using the words in Exercise 9c. Sometimes more than one word is possible.**

1 The temperature gauge was faulty. That's why it was giving _____ readings.
2 The shaft was thinner than it should have been, so its strength was _____ .
3 The power output from the motor varies. We don't understand why it's _____ .
4 The bolt's _____ . It's too big to fit into the hole.
5 The machine's not working as it should. There's some kind of _____ .
6 The braking force on both front wheels should be the same. There shouldn't be an _____ .
7 The fault was _____ . None of the maintenance technicians had noticed it.
8 The control panel isn't working, so you can't control the machine. It's totally _____ .

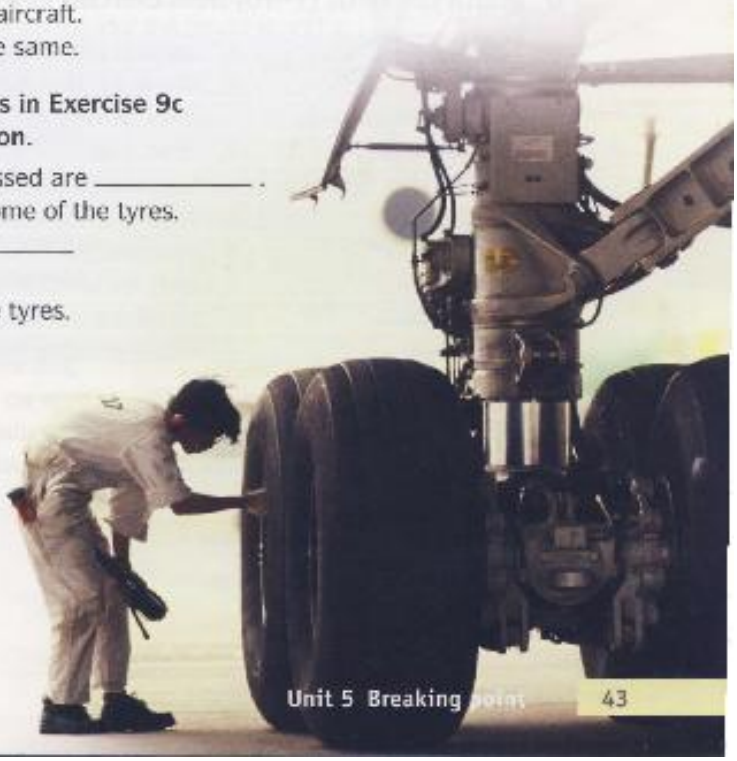
10 a ▶5.4 **Julia, an aircraft service technician, is phoning Alan, a colleague, about a problem with the tyres on a plane. Listen to the conversation and mark the statements True (T) or False (F).**

1 The tyre pressures on the block being discussed are OK.
2 There is too little air inside some of the tyres.
3 The tyre pressures are the same across the aircraft.
4 The degree of wear across all the tyres is the same.

b **Complete the following sentences using words in Exercise 9c to make true sentences about the conversation.**

1 The tyre pressures on the block being discussed are _____ .
2 There is _____ air pressure inside some of the tyres.
3 The tyre pressures on that block are _____ to the rest of the aircraft.
4 The wear rate is _____ across all the tyres.

c **In pairs, discuss the possible causes of insufficient tyre pressure in general, and the specific problem Julia describes in Exercise 10a, and say why each general cause you discussed is likely or unlikely in this case.**



Discussing repairs and maintenance

11 a **In pairs, discuss the difference between repairs and maintenance and decide whether the following words relate to repairs, maintenance or both.**

broken clogged defective faulty worn

b **In pairs, compare car maintenance with aircraft maintenance. Which aspects are quite similar and which are very different?**

12 a **Match the content sections (1–10) of an aircraft service manual to the descriptions (a–j).**

Contents

1	Opening and dismantling access panels	f
2	Topping up, draining and replacing coolants and lubricants	
3	Replacing filters	
4	Safely isolating electrical components	
5	Safely disconnecting and reconnecting electrical components	
6	Mechanical connections to be checked/ tightened at each service	
7	Parts susceptible to wear/damage, to be examined at each service	
8	Sensitive devices to be adjusted at each service	
9	Information on non-serviceable parts / sealed units	
10	Table of component life spans	

a Switching off the power supply
b Making sure certain parts haven't worked loose
c Changing parts that can become clogged
d Adding and changing fluids
e Equipment that needs to be set up precisely
f ~~Taking something to pieces to allow maintenance~~
g Taking parts off and refitting them without danger
h Components that can't be repaired on site
i Details of how long parts are designed to last
j Making sure parts are still in good condition

b **Match the verbs (1–10) from Exercise 12a to the definitions (a–j).**

1	adjust	a	carry out planned maintenance
2	drain	b	change an old or damaged part
3	disconnect	c	check carefully
4	dismantle	d	empty a liquid
5	examine	e	add more fluid to fill a tank to the recommended level
6	replace	f	set up carefully by making small changes
7	reconnect	g	take apart assembled components
8	service	h	apply the correct torque, for example to loose bolts
9	tighten	i	establish a connection again
10	top up	j	remove or isolate from a circuit or network

13 a ▶5.5 **A service technician is examining some machinery and talking to a colleague. What does he say about each point on the maintenance checklist?**

Maintenance Checklist

1 Coolant level _____
2 Coolant condition _____
3 Coolant filter condition _____
4 Blade wear/damage _____
5 Blade alignment _____

b ▶5.5 **Listen again. Do you think the technicians are working on an aircraft or on an industrial machine?**

c **In pairs, discuss what maintenance needs to be carried out on the machinery in Exercise 13a, describing the operations step by step.**

14 a **You work for IPS, a producer of industrial packaging machinery. As a member of the global service team your role is to travel abroad dealing with serious technical problems at your clients' plants. Read the following email from a plant in Helsinki and summarise the problem.**

To: Chris McLean
Subject: Forklift damage to IPS15 Helsinki

Following our phone conversation this morning I confirm that a forklift truck has hit our IPS15 unit. The impact has made a large hole in the main panel on the side of the machine. Our technician who is trained to carry out routine adjustments on the machine has made an external visual inspection. He has advised me that the mechanisms for adjusting the precise alignment of the cutting blades have been damaged. Liquid lubricant is also leaking out from under the machine and a crackling sound can be heard inside the unit when it is switched on – presumably due to earthing/short-circuiting resulting from electrical damage.

I confirm my request for intervention by your service team.

b **In pairs, describe the sequence of steps you'll need to take to carry out repairs when you arrive in Finland, using the notes to help you.**

IPS15 Helsinki

- internal damage
- old parts
- electrical supply: on / off
- lubricant: in / out
- external panels
- alignment of cutting blades
- test
- new parts

15 **Think back to some repairs or maintenance you did, or had done for you, in the past, for example on a car, bike or domestic appliance. In pairs, explain what servicing or repairs were required, and the main steps involved in carrying them out.**

RESUMES & CVS

Lebenslauf auf Englisch: Wesentliche Punkte

(**WELT** 22.04.2021 von Jan Wittenbrink)

Bewerber müssen immer öfter einen englischen Lebenslauf einreichen. Dabei ist es mitunter nicht genug, den deutschen einfach zu übersetzen. Es gelten besondere Formalien. Eine deutsche Angewohnheit kann sogar zum Ausschluss vom Verfahren führen.

Immer häufiger wollen Personalabteilungen einen Lebenslauf auf Englisch sehen. Und das nicht nur, wenn Bewerber sich für eine Stelle im Ausland interessieren. Leider genügt es oft nicht, den eigenen Lebenslauf einfach nur zu übersetzen: Auch die geforderte Struktur und die gewünschten Inhalte unterscheiden sich.

Die Form des Lebenslaufs hängt überdies vom jeweiligen Land ab. **1A** In den USA ist das sogenannte resume (oder résumé) die präferierte Form, in Großbritannien das Curriculum Vitae (CV), sagt Bewerbungscoach Sven Emmrich, Gründer des Portals Karrierehelden. Wenn Unternehmen in Deutschland eine englischsprachige Bewerbung wünschen, **1B** sollte man zunächst herausfinden, welche der beiden Formen gewünscht wird – oder ob doch nur ein deutscher Lebenslauf in englischer Sprache gemeint ist. Oft steht das schon in der Stellenanzeige – ansonsten hilft ein Anruf.

2A Das „resume“ unterscheidet sich vom deutschen Lebenslauf vor allem durch seine Knappheit, sagt Lene Setzer, Leiterin Karriereberatung beim Portal CV-Coach. „Es werden komprimiert die wichtigsten Tätigkeiten beschrieben.“ **2B** Nur die wichtigsten beruflichen Stationen gehören in das Dokument, möglichst auf einer Seite zusammengefasst.

3 Anders als im deutschen Lebenslauf sind Lücken akzeptabel aber sollten kurz erklärt werden.

4 Das „resume“ enthält zudem ein sogenanntes Objective, in dem noch einmal in zwei bis drei Sätzen dargelegt wird, welche Aufgabe man im Unternehmen genau anstrebt.

5 Das Curriculum Vitae dagegen entspricht eher dem deutschen Standard, kann sogar etwas länger als zwei Seiten sein. „Hier wird umgekehrt chronologisch jede Station angegeben“, sagt Bewerbungscoach Emmrich. Auch akademische Publikationen werden genannt, weshalb der CV im akademischen Umfeld auch in den USA verbreitet ist.

6 Der CV enthält auch etwas mehr Fließtext als der stichpunktartige deutsche Lebenslauf.

7 Eine wichtige Besonderheit englischsprachiger Lebensläufe sind Referenzen. Dabei werden Kontaktdaten von zwei bis drei Personen angegeben, bei denen eine Auskunft über den Kandidaten eingeholt werden kann. „Das können zum Beispiel frühere Arbeitgeber oder Professoren sein“, sagt Emmrich. Diese Menschen sollten einem dann natürlich auch wohlgesonnen sein, da sie häufig tatsächlich angerufen würden. **8** Arbeitszeugnisse dagegen sind im englischsprachigen Ausland eher unüblich.

In Ein weiterer Unterschied ist das Bewerbungsfoto: „Während das in Deutschland absolut üblich ist, ist es im englischsprachigen Ausland nicht gerne gesehen“, sagt Lene Setzer von CV-Coach. Grund sei, dass Diskriminierung vermieden werden soll. Vor allem in den USA kann eine Bewerbung mit Foto sogar direkt abgelehnt werden. Denn die Unternehmen fürchten, verklagt zu werden, wenn der Verdacht einer Diskriminierung aufgrund von Aussehen oder Geschlecht aufkommt. In Kanada ist das Mitsenden eines Fotos sogar gesetzlich verboten.

Die Furcht vor Diskriminierung zeigt sich auch an anderer Stelle: **9** So werden in englischsprachigen Lebensläufen häufig auch Geburtsdatum, Geschlecht und Nationalität weggelassen. In den USA gehen manche Unternehmen auf Nummer sicher und verlangen einen Lebenslauf ganz ohne persönliche Daten: Sie schicken Bewerbern ein Formular zu, das anonym ausgefüllt wird.

10 Nicht zuletzt sollte man natürlich auch die englische Sprache perfekt anwenden – und die jeweiligen sprachlichen Besonderheiten des britischen oder amerikanischen Englisch berücksichtigen. Und auch **11** Noten sollten ins jeweilige System „übersetzt“ werden: Mit dem deutschen Notensystem von Eins bis Sechs können Briten und Amerikaner nichts anfangen.

English CV/Resume: Essential points for your exam!

(From **WELT** - 04/22/2021 by Jan Wittenbrink)

Applicants are increasingly required to submit an English CV/Resume. It is sometimes not enough to simply translate the German. Special formalities apply. If you send your CV/Resume in German style, you might well be rejected from the application process.

HR departments increasingly want to see a CV/Resume in English. And not just when applicants are interested in a position abroad. Unfortunately, it is often not enough to simply translate your own CV/Resume: the required structure and the desired content of the English CV/Resume differ.

The format of the CV/Resume also depends on the country. *"In the USA, the so-called resume (or résumé) is the preferred form. In Great Britain the Curriculum Vitae (CV),"* says application coach Sven Emmrich, founder of the portal Karrierehelden. *"If companies in Germany want an English-language application, you should first find out which of the two forms is desired - or whether they just want a German CV in English. This is often already stated in the job advertisement – otherwise a phone call will help."*

*"The **resume** differs from the German curriculum vitae primarily in its succinctness,"* says Lene Setzer, head of career advice at the CV-Coach portal. *"The most important activities are described in condensed form."* Only the most important professional stages belong in the document, summarized all on one page if possible.

In contrast to the German CV, career gaps are not noticeable.

The “resume” also contains what is known as an objective, in which two to three sentences explain exactly what particular position you are aiming for in the company.

The curriculum vitae, on the other hand, corresponds more to the German standard and can even be a little longer than two pages. *"Each position on has held is listed here in reverse chronological order,"* says application coach Emmrich. Academic publications are also mentioned, which is why the CV (similar to the UK CV) is also widespread in the academic environment in the USA. The CV also contains a little more continuous text than the bulleted German CV.

An important feature of English-language CVs/resumes are references. The contact details of two to three people are given from whom information about the candidate can be obtained. *"These could be previous employers or professors",* for example," says Emmrich. Of course, these people should also be positive about the applicant, since they are actually frequently contacted. Job references, on the other hand, are rather unusual in English-speaking countries.

Another difference is the application photo: *"While this is absolutely normal in Germany, it is not acceptable in English-speaking countries,"* says Lene Setzer from CV-Coach. The reason is to avoid any charge of discrimination. Especially in the USA, an application with a photo may well be rejected outright as companies fear being sued if suspicion of discrimination based on appearance or gender arises. In Canada, sending a photo is even forbidden by law.

The fear of discrimination is also evident elsewhere: Date of birth, gender and nationality are often left out in English-language CVs/resumes. In the USA, some companies play it safe and require a CV without any personal data: they send applicants a form that is filled out anonymously.

Last but not least, you should of course also write the English language perfectly, while taking into account the differing linguistic characteristics of British or American English. Moreover, grades should be "translated" into the respective system. British and Americans do not use or understand the German grading system, i.e. from 1 to 6.

Traditional tips for Writing a Resume as a Pre-Grad or Graduate to get a Job or an Internship

NOTE! The resume/CVs on pages 52-55 contradict some of the information below

A Traditional differences between a US Resume and UK Curriculum Vitae (CV):

Resume (US - includes Canada)

- Generally resumes are said to be not longer than a page; however, for engineering resumes they can be 2 pages.
- They are adapted to various positions you are applying for, so the content may change.
- Not everything has to be ordered chronologically
- In the UK high school qualifications may be included. In the US this is not the case if you left high school at least 2 years before.

Curriculum Vitae (UK - that includes British Commonwealth nations, e.g. India, Australia, etc.)

- Could be 2 pages.
- More detail about your achievements
- Include publications, awards, honours, etc.
- Basically does not change content, while the cover letter will change.

B Personal Statement (Profile) or Objective

- This comes at the beginning of your Resume or CV after your contact details.
- An Objective or Career Goal is common in the US but not in the UK.
- A Profile, known as a personal statement, is less common in the US. In the UK, a Personal Statement is quite common.
- An objective is a statement of the type of position you want: e.g.
  "Mechanical Engineer seeking internship at Hahn Automation to further my practical skills.)
- A personal statement or profile is a brief summary of your skills, experiences, goals related to the position you want): e.g.
  "Mechanical Engineer, trilingual (German, English, Turkish) with one year experience of working in Astech Robotics AG in Frankfurt in the field of pharmaceutical robotics and automation. Captain of university baseball team, with leadership skills and skilled at encouraging teamwork."
- A profile can also be a bulleted list.

C What is a Resume or a CV?

- It is not a job application.
- A resume or CV does not get you a job.... it gets you an interview.
- It is an opportunity for human resources to get a quick impression of you.
- It is constantly evolving as your life changes.
- The style changes when you enter university, graduate or look for your first job.

D Employers

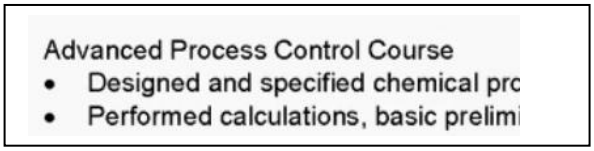
- Recruiters in the US only look at one page. UK recruiters will look at the second page, too.
- Recruiters in the US are said to only look at a resume for 10-30 seconds before they make a decision, so for US recruiters, make sure your resume is **on one page**. For the UK 2 pages is common.
- Everything you want the recruiter to know about you should be on that one page even for a UK resume. For the UK resume, there may be more to say but put the most important on page 1!
- If recruiters have to search for information, they won't!
- The first thing US recruiters are looking for is what kind of a job or internship the applicant is looking for.
- Recruiters don't do paragraphs.... so you shouldn't either.
- Recruiters have a shopping list of positions to fill, so first they look at your Objective.
- Recruiters do not want to take a risk, so you should present yourself as reliable.
- Employers generally think engineers are clever (smart), comfortable with technology, ready to learn new things, and think like engineers (i.e. creatively but practically).

E Grammar and vocabulary

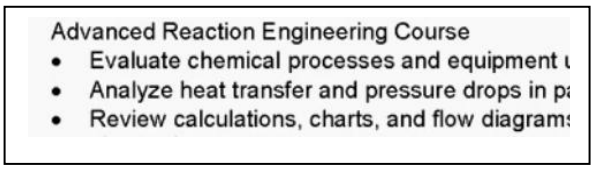
- Only use full stops (periods) if it is a sentence with a verb AND a subject.
- Present tense for current and ongoing projects

F Format

- Use bullet points.
- Use action verbs, typically 'ed' verb forms to describe what you did, e.g.



- Use parallelism; i.e. if you write Verb-noun, then carry that style throughout the document, e.g.



- Suggested Fonts: Verdana, Helvetica, Calibri , size 11 (or possibly even 10) with headings size 14.
- Dates usually in reverse order i.e. newest stuff comes first (US and UK).

G Content

- If you are responding to a job posting, **always** use the same terms/vocabulary as the job posting.
- The objective says what field the applicant wants to work in, e.g. mechanical OR electrical engineering.
- Sometimes the objective states the specific job and company you are interested in.
- The objective also states whether the applicant is looking for an internship, part-time or fulltime position.
- Make sure what is written on your resume is exactly what is necessary for that position.
- At the top of the resume: (1) full name, (2) phone number, (3) email address, (4) address
- Work experience is more important than anything else, so internships are crucial.
- Include your technical skills, computer building, car mechanics, etc.
- Include any foreign language abilities AND any other relevant skills.
- Bland is OK.
- Start with the most relevant and put the least relevant, i.e. less technical, at the bottom.

H Do not....

- ...use cute names for your email address OR phone numbers that have cute messages.
- ...write vague objectives, e.g. "To obtain an exciting career..."
- ...overly grand objectives, e.g. "... where I can increase the profitability of the company."
- ...by mistake say you are looking for work in another sector from the one they are applying for.
- ... include bizarre pictures or floral borders
- ...put a photo in your resume or CV. In the US this can cause the company legal problems.
- ...use unusual fonts or unusual formatting which make it hard to read.

I This is important: Die wichtigsten Unterschiede zwischen Lebenslauf und Resume/CV

Anders als in Deutschland ist es unüblich, den persönlichen Status zu nennen (verheiratet oder nicht). Fotos sind verpönt und in der USA fast verboten. Sogar der Geburtstag wird immer seltener erwähnt, um Diskriminierung vorzubeugen. Die Nationalität ist nur nötig, falls es sie für die Position relevant ist – zum Beispiel im Falle von notwendigen Arbeitsvisen. Wer sich also als Deutscher innerhalb der EU bewirbt, kann seine Nationalität weg lassen.

A quick summary *auf Deutsch* of some of the traditional differences between a German Lebenslauf and its English equivalent

	Deutscher Lebenslauf	US Resume & UK CV
Foto	Ja	Nein (UK); Nein!!! (US)
Status	Möglich	Nein & Nein
Geburtstag und -ort	Ja	Möglich, aber nicht notwendig
Nationalität	Nur, falls nicht aus Namen und Geburtsort erschließbar	Nur, wenn ein Arbeitsvisum nötig ist
Persönlichkeitsprofil	Nein	Ja, möglich; Nein, Ziel brauchen Sie (US)
Karriereziel	Möglich, kurz angestrebte Position nennen	Ja, Position und wichtigste Qualifikationen nennen
Hobbies	Ja, kurz halten	Ja, mit Details (UK); kurz halten (US)
Referenzen	Nein	Ja, möglich (UK); normalerweise nicht (US)
Datum und Unterschrift	Möglich	Nein & Nein

URLs about Resumes, CVs & Cover Emails

There are many resources for writing both a Resume and a Curriculum Vitae (CV) as well as a Cover Email on the Web. Here are some suggestions:

Resume (US - style)

https://www.youtube.com/watch?v=hB19zqgyZDg
YouTube video on how to write a US engineering resume.

https://www.youtube.com/watch?v=aICE-npYjgM
An engineer talking about resumes he likes

http://www.foreigncredits.com/Resources/GPA-Calculator/Germany
GPA calculator (so you can add your German GPA).

Curriculum Vitae (UK - style)

https://www.prospects.ac.uk/careers-advice/cvs-and-cover-letters/how-to-write-a-cv
Good summary of a CV

https://www.theguardian.com/careers/cv-tips-for-graduates
Some tips from the Guardian newspaper

https://www.youtube.com/watch?v=QRBCkA3ZPcU
CV for structural engineer

Cover Email

https://www.cv-library.co.uk/career-advice/cover-letters/cover-letter-mistakes-killing-application/
Major mistakes when writing a cover letter.

https://www.thebalance.com/email-cover-letter-format-2060427
Email Cover Letter Format

https://www.thebalance.com/tips-for-sending-email-cover-letters-2058491

US resume 1

AYLA SCHMIDT

Lindenstrasse 11, 23459 Neustadt , Hessen, Germany
aylaschmidt@gmail.com (+49) 234-678-910

OBJECTIVE

Seeking a ***mechanical engineering*** internship utilizing my leadership, interpersonal and organizational skills.

EDUCATION

Frankfurt University of Applied Sciences, Frankfurt, Rheinland-Pfalz, Germany
Pursuing ***Bachelor of Science, Industrial Engineering***
Expected Date of Graduation May 2023
GPA: 3.24

WORK EXPERIENCE

Hahn Automation, ***Engineering Intern***, Rheinboellen, Germany July 2022 - Present

- Worked with Construction Support Group on operator control testing and listing of all pertinent personnel.
- Redesigned warehouse facilities job shop by restructuring overall process layout.
- Provided three possible alternative industrial warehouse layouts for evaluation and approval.
- Determined use of space for new warehouse layouts in current facility and will translate to new warehousing location.

PROMES, ***Facilitator Assistant***, Frankfurt, Germany August 2021 - May 2022

- Facilitated four courses in chemistry and engineering laboratory for 20-30 engineering students.
- Scheduled and graded examinations and homework assignments for freshman and sophomore students enrolled in the Program for Mastery in Engineering Studies (PROMES).

Aufbau AG, ***Industrial Engineering Intern***, Frankfurt, Germany August 2020 - Sept. 2020

- Facilitated Designed new facilities layout fo the manufacturing plant utilizing CATIA.
- Developed safety standards for plant's preventative maintenance program.
- Projected the optimal replacement of machines and lighting fixtures using engineering methods to determine optimal use.
- Designed standard matrix for glue banding machines and provided analysis of six woodworking facilities to CFO's €20K indirect variable budget.

Volunteer Experience

- Facilitated Designed new facilities layout fo the manufacturing plant utilizing CATIA.
- Coordinated activities for Science and Math Club.
- Scheduled volunteers for Jubilee Festival for events , booths and food-ticket sales.
- Participated with Habitat for Humanity in South America, building 25 new homes in 60 days.
- Answered incoming calls and documented donations for ZDF TV charity marathon.

Skills

Fluent in English, Turkish and French, able to read Arabic
Experienced in web design, PhotoShop, MS Office

Activities and Interests

Tutored peers in Science and Mathematics Courses, August 2020-June 2021
Trombonist in Frankfurt University Big Band.
Keen mountain biker.

US resume 2

EGBERT SCHNEIDER

Hauptstrasse 10
56789 Altdorf
Hessen, Germany

0049 (0)345 678 910
schneibert@gmail.com

OBJECTIVE

To obtain the Process Engineer position with Parsons Energy and Chemicals.

EDUCATION

Master of Science, Chemical Engineering - Expected August 2023
Frankfurt University of Applied Sciences, Frankfurt a. M, Hessen, Germany

- **GPA**: major 3.55, cumulative 2.75
- **Courses**: Advanced Reaction Engineering, Advanced Process Control, Reaction Kinetics for Industrial Processes, Operations Research - Optimization Methods, Chemical Processing for Microelectronics.

Bachelor of Science, Chemical Engineering - Awarded August 2017
Frankfurt University of Applied Sciences, Frankfurt, Rheinland-Pfalz, Germany

- **Courses** : Advanced Reaction Engineering, Chemical Process Analysis, Reactor Engineering, Bioprocess Engineering, Heat and Mass Transport, Particle Mechanics and Processing, Separations Phenomena.

RESEARCH AND DESIGN PROJECTS

Advanced Reaction Engineering Course

- Evaluate chemical processes and equipment utilized for reactor system.
- Analyze heat transfer and pressure drops in packed reactor beds.
- Review calculations, charts and flow diagrams to analyze impact of heat loss from reactors on electronic components.

Advanced Process Control Course

- Designed and specified chemical process equipment for pressure vessel relief system.
- Performed calculations, basic preliminary analysis and evaluated equipment suppliers.

TECHNICAL SKILLS

Computer

- Programming Languages C, C++, BASIC, Visual BASIC, FORTRAN, MATLAB
- Publishing Languages: Latex, HTML, JaveScript
- Application Software MATLAB, Mathematics, Eclipse, Microsoft Office
- Operating Systems UNIX, DOS and Windows

Numerical Methods . Finite Elements. Finite Volumes PED Integration, SIMPLEX and Interior Point Optimization Methods.

COMMUNITY SERVICE

- Tutor of German language for refugees - July 2022 - Present
- Student Council Representative - liaising between faculty and students - September 2015- August 2016

NOTE: This student has very little work experience so he highlights his Research and Design Projects.

UK CV page 1

CURRICULUM VITAE

Claudia Mueller
Hauptstr. 11
70180 Stuttgart, Germany
Phone: +49 7112222, +49 1793333333 (mob.)
Claudia.Mueller@gmx.net

OBJECTIVE

Final year MEng Mechanical Engineering student with a year's industrial experience, seeking a graduate role in automotive manufacturing, with the aim of becoming a chartered engineer

EDUCATION

Oct 2019 – May 2023 **MEng (Hons), Mechanical Engineering**
Frankfurt University of Applied Sciences, Frankfurt (Frankfurt am Main), Germany

Relevant modules included: Design and Manufacturing, Applications of Thermofluid Dynamics, Vehicle Drives and Dynamics, Energy Sources and Storage, Electrical Engineering

- Designed, built and tested a wind turbine, using CAD software during the design stage.
- Worked as part of a team of five on an industry project to design a winch, designing the final design presentation to a panel of industry representatives.
- Produced designs for fully functional machines and assemblies that could be manufactured economically compliant with legal requirements and standards.
- Operated CNC machine tools in manufacturing lab and conducted materials and degradation testing
- Developed mechatronics and electronics skills for programming robots and automated devices through weekly lab sessions.

Aug 2016 – Jun 2019 **Abitur (equivalent to A-levels/qualification for university entrance)**
Carl-Schurz-Schule, (secondary school), Frankfurt (Frankfurt am Main), Germany

WORK EXPERIENCE

Aug 2018 – Aug 2019 **Mechanical Engineering Internship, BMR Engineering, Offenbach**

- Delivered projects as part of a multi skilled engineering team, designing oilfield products, services and digital solutions
- Created detailed drawings, schematics, concept designs and design calculations, using Pro-Engineer 3D solid Modeler and Team Center for drawing management
- Presented design briefings and project plans to clients, explaining recommendations and negotiating on price
- Designed test plans and executed tests to contribute to failure mode and effect analysis, complying with company policies and procedures
- Provided technical support to operations projects, requiring frequent travel and field work

June 2017 - Aug 2017 **Manufacturing Engineering Internship, AVEVA, Mainz, Germany**

- Worked with diesel engine and turbo charger technologies, supporting the engineering team with manufacturing tasks and projects
- Identified ways to modify and improve current processes and procedures making recommendations to senior colleagues
- Assisted with the implementation of new processes, systems and technology, providing training to staff and creating supporting documents and resources.
- Resolved technical issues identified by external customers or through analysis of trends in data.

UK CV page 2

Jan 2019 - July 2019 **Store Associate, Nimbus Health GmbH, Frankfurt am Main**

- Advised customers on health and lifestyle products, providing friendly and approachable customer service
- Operated a cash register, handling transactions
- Trained new members of staff on stock management

Sep 2017 – Jul 2018 **Office Administrator, WISAG Job & Career, Frankfurt am Main**

- Handled customer queries over the phone and by email
- Updated and maintained spreadsheets and databases to comply with audit standards
- Managed the diary of senior colleagues and booked travel arrangements.

ACHIEVEMENTS

Jan 2022 – Mar 2022 **Formula Student Competition**

- Competed as part of a team of four in the IMech's Formula Student Competition to design, build and race a single-seat race car.
- Coordinated team meetings and took a lead role in project planning, delegating tasks and evaluating progress against targets.
- Presented our prototype for a single-seat race car for autocross racing to a manufacturing firm at the Silverstone Circuit.

Oct 2019 **Technical Video competition**

- Member of the winning team Frankfurt University of Applied Science's "Start Project"
- The task of the "Start Project" was to design a video explaining the technology behind Elon Musk's reusable rocket technology to children from 6 to 9-years-old.

ADDITIONAL SKILLS

- IT
  - AutoCAD.
  - Automated model programming.
  - CAD (computer-aided design)
  - Engineering product data management software (EPDM)
  - Microsoft office suite experience.

- Full clean driving licence.

- Languages
  - English (C1) highly proficient
  - French (B2)

INTERESTS & HOBBIES

- University engineering faculty football team: centre-back
- Karate: brown belt
- Cooking and baking
- Environmental club "Keep the Main Clean!" : Monthly canoeing along the River Main removing rubbish from the water

Cover email 1

Dear Mr Phillips,

Please accept this letter and the accompanying CV as an expression of my interest in a position with your company. I am fascinated by boiler technology and have experience with that field of engineering.

As my CV indicates, in June 2023, I expect to receive a Bachelor of Science degree in mechanical engineering from Frankfurt University of Applies Sciences in Frankfurt, Germany. I would then would be delighted to begin employment with Babcock & Wilcox should a position be availab.e

I have acquired a sound overall knowledge of leading edge engineering principles, tools, and practices, with emphasis on designing, building and testing of mechanical systems. I am proficient in the use of various automated solutions including current releases of AutoCAD and SolidWorks.

I have applied classroom learning to innovative and successful projects in which I served as sole or principal designer. Additionally, I have been a responsible leader in a family owned boiler repair business.

My personal attributes include leadership and sound judgment as well as creativity, analytical and troubleshooting skills. I have fluency in English and interact productively with people from diverse backgrounds. I have a career history of achieving employment goals. I have a history of quality work carried to timely completion, as detailed in my resume.

I am certain I could make positive contributions to your organization, and I would welcome the opportunity to meet with you in person or online to discuss how my education and abilities might be employed by your organization.

Thank you for your consideration. I look forward to your response.

Kind regards,

your name

Cover email 2

Dear Mr Jones,

I am writing to apply for the R&D Product Development Summer Intern position, found on your company's website.

I am in my 3rd year of a Bachelor of Science in Engineering at Frankfurt University of Applied Sciences in Frankfurt, Germany. I am majoring in Mechanical Engineering & Applied Mechanics.

With my engineering coursework and project experience, as well as my affinity for problem solving, I believe I am a strong candidate for the Intern position your advertising. As an undergraduate, I have maintained a rigorous course load and completed a number of extracurricular projects that have allowed me to enhance my skills relevant to this role.

Through my academic project work I have developed abilities in CAD and modelling, an understanding of materials, and have practiced different manufacturing technologies. For example, in my Machine Design and Manufacturing course, I along with two teammates created mechanical drawings and designs in SolidWorks. We then modelled, machined and assembled the parts of a working Stirling engine, meeting or exceeding all requirements and deadlines.

I have also developed the strong interpersonal and communication skills required to succeed as an R&D Product Development intern. In addition to team projects that require collaboration and strong writing and presentation skills, I have been selected by my peers for a leadership role within my university's Formula SAE team this year.

Attached, please find my resume for your consideration. It contains not only a description of my Stirling Engine project, but also a more in-depth review of other engineering projects I have completed.

I look forward to hearing from you. Thank you for your consideration.

Kind regards,

your name

Cover email 3

Dear Hiring Manager,

I was thrilled to find a Mechanical Engineer position advertised on your website. As student of Frankfurt University of Applied Sciences in Frankfurt, Germany, with an outstanding GPA and several additional electro-mechanical projects under my belt, I am confident I would be a formidable candidate.

The position you are offering calls for "an independent self-starter with an analytical mindset and strong CAD skills". I have completed 20+ personal projects utilising CAD while actually building many of the designs. Some more details of the projects I have realised are available in my resume.

The most complicated machine I have constructed has been an AI-based pathfinding vehicle. I submitted my vehicle to the European BEST Engineering Competition in 2021 where it won 1st prize in its category.

At Frankfurt University of Applied Sciences I received the highest grades in CAD during my university course. Throughout my university studies I have maintained an extremely high GPA. I believe I have developed the necessary academic skills as well as practical talents through my university course and extracurricular projects to be of great benefit to the Boring Company.

I would be very grateful for the opportunity for an interview where I could showcase my abilities.

Kind regards,

Mehmet Rotkrug

Content and Useful Phrases in a Cover Email

Greetings

If you don't know the person's name and have no way to find out that information, begin your email with a greeting that includes a logical professional title, such as:
Dear Recruiter,
Dear Director,
Dear Manager,
Dear Hiring Manager,
Dear Human Resources Manager,
Dear Personnel Manager,

Opening

Deutsch	English	*When to use?*
Sehr geehrter Herr,	Dear Sir,	*Formal, male recipient, name unknown*
Sehr geehrte Frau,	Dear Madam,	*Formal, female married/**un**married, name unknown*
Sehr geehrter Damen und Herren	To whom it may concern, **OR** Dear Sir or Madam,	*Formal, when addressing several unknown people or a whole department.*
Sehr geehrter Herr Schmidt,	Dear Mr. Smith,	*Formal, male recipient, name known*
Sehr geehrte Frau Schmidt,	Dear Mrs. Smith,	*Formal, female recipient, married, name known*
Sehr geehrte Frau Schmidt,	Dear Ms. Smith,	*Formal, female recipient, name known, marital status unknown or not important*
Hiermit bewerbe ich mich um die Stelle als ..., die Sie in ... vom ... ausgeschrieben haben.	I wish to apply for the post of…which you advertised in…on…	*Standard formula for applying for a job whose advertisement you saw in a newspaper or magazine*
Bezugnehmend auf Ihre Anzeige auf ... schreibe ich Ihnen...	I am writing in response to your advertisement posted on…	*Standard formula used when responding to an advertisement posted online.*
Bezugnehmend auf Ihre Anzeige in ... vom...	I refer to your advertisement in…dated…	*Standard formula used to explain where you found the advertisement for a job.*
Mit großem Interesse habe ich Ihre Anzeige für die Position eines erfahrenen ... in der Ausgabe ... vom ... gelesen.	I read your advertisement for an experienced…in the…issue of…with great interest.	*Formula used when applying for a job having seen the advertisment in a magazine or periodical*
Ich bewerbe mich um die Stelle als...	I would like to apply for the position of…	*Standard formula for applying for a job*
Derzeit arbeite ich für... . Zu meinen Aufgaben zählen...	Currently I am working for… and my responsibilities include…	*Used as an opening sentence to describe your current occupational status and what it involves*
Die Stelle ist für mich von großem Interesse, weil...	I am particularly interested in this job, as…	*Used to explain why you would like a certain job*
Gerne würde ich für Sie arbeiten, um...	I would like to work for you, in order to…	*Used to explain why you would like a certain job.*
Zu meinen Stärken zählen...	My strengths are…	*Used to show what your key attributes are*
Ich eigne mich für diese Position, weil...	I would be well suited to the position because…	*Used to explain what makes you a good candidate for the job.*
Zwar kann ich keine Erfahrung in... vorweisen; dafür habe ich...	Although I have no previous experience in…, I have had…	*Used if you have never had the chance to work in a certain business field, but can demonstrate qualities from other experiences you have had*
Meine beruflichen Qualifikationen entsprechen den Anforderungen Ihres Unternehmens.	My professional qualifications / skills appear to be well suited to your company's requirements.	*Used to explain what skills make you good candidate for the job*
Während meiner Zeit als... habe ich meine Kenntnisse in... verbessert / erweitert / vertieft.	During my time as ..., I improved / furthered / extended / my knowledge of…	*Used to demonstrate your experience in a certain field and ability to acquire new skills*
Mein Fachgebiet ist...	My area of expertise is…	*Your main attributes and experiences are*
Während meiner Arbeit bei... bin ich	Whilst working at… I became highly	*Used to demonstrate your experience in a certain*

in ... sehr sachkundig geworden...	competent in…	*field and ability to acquire new skills.*
Auch in stressigen Situationen vernachlässige ich nicht Sorgfalt und Genauigkeit. Daher wäre ich besonders geeignet für die Anforderungen als...	Even when working at high speed, I do not neglect accuracy and would therefore be particularly suitable for the demands of working as ….	*Used to explain why you would be good at the job using the experience gained from your previous employment history*
Auch unter Belastung behalte ich hohe Qualitätsstandards bei.	Even under pressure I can maintain high standards.	*Used to show that you can work in a demanding business environment.*
Somit würde sich für mich die Gelegenheit ergeben, meine Interessen mit dieser Position zu verknüpfen.	And thus I would have the opportunity to combine my interests with this placement.	*Used to show that you have a personal interest in the job*
Ich interessiere mich ganz besonders für diese Stelle und würde mich sehr über die Gelegenheit freuen, in der Zusammenarbeit mit Ihnen mein Wissen zu erweitern.	I have a lively interest in … and would appreciate the opportunity / chance to broaden my knowledge by working with you.	*Used to show that you have a personal interest in the job*
Wie Sie meinem beigefügten Lebenslauf entnehmen können, entsprechen meine Erfahrung und meine Qualifikationen den Anforderungen dieser Position.	As you can see from my enclosed résumé, my experience and qualifications match this position's requirements.	*Used to highlight your résumé and show how well the job would suit you*
Meine derzeitige Position als... bietet mir die Gelegenheit, in einem anspruchsvollen Umfeld zu arbeiten, wo die enge Zusammenarbeit mit meinen Kollegen unverzichtbar ist, um vereinbarte Fristen einzuhalten.	My current position as…for...has provided me with the opportunity to work in a high-pressure, team environment, where it is essential to be able to work closely with my colleagues in order to meet deadlines.	*Used to display what skills you have gained from you current job*
Zusätzlich zu meinen Verantwortlichkeiten als... habe ich auch Fähigkeiten in... erworben.	In addition to my responsibilities as..., I also developed…skills.	*Used to show additional skills gained from your current job. Skills that may not normally be associated with your occupational title*

Skills

... ist meine Muttersprache; darüber hinaus spreche ich...	My native language is…, but I can also speak…	*Used to show your native language, and also other languages in which you have fluency.*
Ich verfüge über sehr gute Kenntnisse in...	I have an excellent command of…	*Used to show non-native languages that you can communicate to a high level in*
Ich besitze solide Grundkenntnisse in...	I have a working knowledge of…	*Used to show non-native languages that you can communicate to an intermediate level in*
Ich verfüge über ... Jahre Erfahrung als...	I have …years experience of working…	*Used to show your experience in a certain business area.*
Ich verfüge über gute Kenntnisse in...	I am an experienced user of…	*Used to show what computer software you can use*
Ich denke, dass ich über die geeignete Kombination aus... und ... verfüge.	I believe I possess the right combination of...and… .	*Used to show how balanced your skills are*
ausgezeichnete Kommunikationsfähigkeiten	Excellent communication skills	*The ability to share information with and explain things to your colleagues*
schlussfolgerndes Denken	Deductive reasoning	*The ability to understand and explain things quick and effectively*
logisches Denken	Logical thinking	*The ability to construct one's ideas in a precise, well thought-out manner*
analytische Fähigkeiten	Analytical skills	*The ability to assess things in detail.*
hohe soziale Kompetenz	Good interpersonal skills	*The ability to manage and communicate with colleagues effectively*
Verhandlungsgeschick	Negotiation skills	*The ability to do deals with other companies effectively*
Präsentationsfähigkeiten	Presentation skills	*The ability to communicate ideas effectively in front of a large group*

Closing

Ich bin hochmotiviert und freue mich auf die vielseitige Tätigkeit, die mir eine Position in Ihrem Unternehmen bieten würde.	I am highly motivated and look forward to the varied work which a position in your company would offer me.	*Used when closing to reiterate one's desire to work for the company*
Ich sehe die neuen Aufgaben / diese Position als willkommene Herausforderung, auf die ich mich freue.	I see new tasks / this position as a welcome challenge, which I look forward to.	*Used when closing to reiterate one's desire to work for the company*
Ich würde mich sehr über die Gelegenheit freuen, weitere Details zu der Position mit Ihnen persönlich zu besprechen.	I would welcome the opportunity to discuss further details of the position with you personally.	*Used when closing to hint at the possibility of an interview*
Anbei erhalten Sie meinen Lebenslauf.	Please find my résumé / CV attached.	*Standard formula used to tell the employer that your résumé / CV is included with the cover letter*
Auf Wunsch sende ich Ihnen gerne die Zeugnisse von ... zu.	I can supply references from…if required.	*Standard formula used to tell the employer that you are willing to provide references.*
Zeugnisse können bei ... angefordert werden.	References can be requested from…	*Used to tell the employer that you are willing to provide references and who they can contact for these*
Für ein Vorstellungsgespräch stehe ich am ... zur Verfügung.	I am available for interview on…	*Used to indicate when you are free for an interview*
Vielen Dank für Ihr Interesse. Ich würde mich sehr über die Gelegenheit freuen, Sie in einem persönlichen Gespräch davon zu überzeugen, dass ich der geeignete Kandidat für diese Position bin. Bitte kontaktieren Sie mich per...	Thank you for your time and consideration. I look forward to the opportunity to personally discuss why I am particularly suited to this position. Please contact me via…	*Used to give one's prefered contact details and to thank the employer for reviewing your application*
Mit freundlichen Grüßen	Yours sincerely, Kind regards, Best regards, Warm Regards,	*Formal, widely used, recipient sometimes unknown.* *Remember:* *1. Capitalise ONLY the first word;* *2. Use a comma after the second word.*

19 Cover Email Tips

1. Make it personal. Try (if possible) to address your email to a specific person.
2. Say that you would like to apply for the job.
3. Say where you found out about the job.
4. Say why you are qualified to do the job.
5. Say why you would like the job.
6. Read the job description carefully and look for key words/phrases throughout the job description and highlight them. Then use them in your cover letter.
7. Correct spelling and grammar.
8. A good subject line is clear about the job you want, e.g. 'Bilingual Engineer seeks Robotics position'.
9. Quick pitch: 150 words or fewer.
10. First paragraph is crucial.
11. No emoticons, abbreviations, wild colours or fonts. And no humour.
12. Don't write 'I'm a hard worker' or stupid stuff like that.
13. ATS tools are used by recruiters to track keywords, so put in appropriate keywords.
14. Find out from company website if attachments are allowed.
15. Close with a thank you.
16. 2-4 sentences per paragraph.
17. You can use the exact words taken from the job description.
18. Say when you would be available for interview.
19. Say you can provide more information if necessary.

How to write a resume to land a job at Tesla

The following is the transcript of a real and recent presentation by an American graduate explaining the background to his successful resume. With this resume the applicant landed a job at Tesla.Watch the video. It is available on our Moodle page under **Lesson SIX.**

***Then**, watch the video again while reading this transcript below. You can pause sometimes because the speaker speaks very fast.*

***Next**, download the actual resume and have a look at it.*
It is available on our Moodle page under **Lesson SIX.**

***Finally**, discuss in your group what you learned from this young man's success with his somewhat unorthodox resume.*

This past summer I worked at Tesla as a mechanical design engineer. So in this video I'm going to share with you the resume and portfolio that got me that job interview, and eventually the job offer.

First, you notice when looking at my resumes that I like to structure in this 2 column format. One of the most common questions that comes to mind when you see a resume like this is, will the **ATS**[1] be able to read this resume?

If you're unfamiliar, the ATS is a system that companies use that automatically reads your resume when you apply to jobs online. If it can read your resume, and your resume has everything that the company you're applying to is looking for, it will then send your resume to an actual human recruiter or human hiring manager that will look through your resume. However, if the ATS can't read your resume then it won't send it to these humans, so you won't even get a chance to have your resume be looked at. So to make sure your resume can be read by the ATS there's this website that someone created that allows you to input your resume and it tells you if it's readable. It's completely free by the way, so I'll put a link to it in the description[2] if you want to give it a shot with your own resume.

Anyways[3], let's have a look at my skill section in the resume.

So because I'm applying to mechanical design engineering roles I like to break down my skills into three categories: CAD, Mechanical, as well as Electrical & Software. Under the CAD category, I include all the softwares[4] I have experience with like SOLIDWORKS, CATIA, Nx, AutoCAD and Arena Solutions. Also for Tesla CATIA is very important because that's the most common CAD software that they use at that company. Oddly enough, for some reason, I included Adobe Creative Suite in this section, but I don't know why I did that. It's not needed at all for the jobs I was applying to.

Anyways, moving on to the Mechanical category of my skill section, here I include all my mechanical engineering skills that aren't related to CAD software. So that includes using tools like 3D printing, doing DfM[5] and DfA[6] in my designs, as well as tolerance analysis. These are skills that are really important for mechanical engineering jobs. Usually every engineering discipline has its own set of skills that are really important.

If you're curious as to how I know what skills I need to learn and what skills I need to put on my resume to help me stand out, here's how: I've probably applied to thousands of jobs so I was able to see patterns of what skills show up the most in a lot of the job descriptions I was reading. So I made sure to learn those skills and put them in my resume eventually.

---

[1] Applicant Tracking Software

[2] LINK to ***free*** ATS checker list of various ATS checkers

[3] "anyways" is actually slang, nonstandard, colloquial or informal English. It is related to the more usual word 'anyway'. However, the expression 'anyways' and even 'anyway' should probably not be used in a job interview. (*But the speaker says it a lot!* ☺)

[4] Originally the word 'software' is a non-count noun. But language changes with use and in colloquial English many people now add an 's' as in 'softwares'. (*I don't like it though!* ☺)

[5] DfM = Design for Manufacturing

[6] DfA = Design for Assembly

Anyways, the last part of the skill section of my resume is Electrical and Software. Under I included some basic non-mechanical skills that I have, like C++, MATLAB, as well as soldering and wiring. It's a pretty small section since the skills in it aren't that important for the type of jobs I was applying for.

Next, let's move on to my actual work experience. All the experience you see in this section is through internships, which is why the duration was only four months long for each one. I actually did five internships, but I only included the four most relevant ones on this resume since that's all the space I had if I was trying to keep it just under a page. For each experience I included the company name, job title, location and job duration. Then I'**ll**[7] include three to six bullet points for each experience that I have on my resume, and each bullet point **will** include what I did, how I did it, and the results of what I did, to the best of my ability.

For example, here I say "improved fixture designs by adding self-locating features, reducing CNC setup times by 15%". With this bullet point, the "**what**" section is 'improved fixture designs'; the **"how"** section' is "by adding soft locating features" and the **"why"** section is "reducing CNC setup times by 15%". Ideally every bullet point should be structured like this, but I have some bullet points where I only talk about **what** I did and **how** without really mentioning the results, which is something I definitely could have improved on my resume. But that's okay because my portfolio makes up for it, which I'll share with you a little later in this video.

Another example of a good bullet point is "Designed a custom test fixture using Solidworks to reduce a subassembly time by over 25%", since the "**what**", "**how**" and "**why**" are clearly mentioned. It also really helps to include numbers in the **why** section of the bullet points because engineers really love numbers. You'll also notice how I like to bold (**fettdrucken**) the keywords or key skills that are important for a mechanical engineering role. Some people recommend it, other people say it might be distracting, but I personally like to include it. Also all the bolded words you see on my resume are kind of skills that you'd see in most common mechanical engineering job descriptions. So when hiring managers are looking through my resume, I bolded to kind of make their life a little easier, so I think bolding is really helpfu,l but that's just my opinion.

Now let's move on and talk about personal projects on my resume. This is a small section since it's not as important as my work experience section. The purpose of it is to show that I have a genuine interest in engineering. I do make sure, though, to talk about my projects in more detail in my portfolio. If you have very little work experience though, then your project section should be a lot longer than mine since it kind of needs to make up for the lack of work experience that you have.

Now let's talk about education. I like to put that section at the bottom since employers in engineering, especially at **Tesla**, don't really care about your grades or where you studied. They care so much more about your actual work experience. But anyways, my education section just included my degree, the year I graduated, and my overall average. You don't have to include your average, though, if you don't want to.

Next, we have the extracurricular section in my resume. This section is very similar to the project section in that it's not mandatory but it's just nice to have. I didn't have much experience using tools like drills, mills and lathes in my internships here, so I made sure to include it in my extracurricular section. Again, if you have no past work experience then your extracurriculars and projects are super important and you need to talk about them in a lot more detail to make up for the lack of work experience.

You'll also notice in my resume that I still care about its design and I try to have it visually appealing. To be honest, I don't think that matters too much for hiring managers reading your resume, as long as your resume doesn't look like this. A plain and simple design like that will do you just fine. However, when I interviewed with some startups with this resume they told me that they really liked this design and it made me stand out. But larger companies didn't really care. If you want to design your resume to look similar to mine, I personally use **Canva**[8] to do this; it's easy, free, and they're not sponsoring me to say this. I just think it's pretty cool. I'll link my resume in the video description if you want to have a closer look at it for inspiration for your own resume. (***cf. Lesson ELEVEN on our CampUAS page***: Resume that landed a job...)

Now let's have a look at arguably the most important section of your resume which is attaching a portfolio. If there's one thing you should get out of this video it's that you need to attach a portfolio to your resume to make you stand

[7] Notice the speaker uses the future form, 'I'll' or later in the sentence 'will' to talk about how he created this resume. What that means is that he is talking about something he does for every resume. It is rather confusing the way native speakers mess around with verb tenses…. but that is what they do! ☹

[8] LINK to ***free*** Canva templates

out. It essentially builds on top of the projects that you already talked about in the first page of your resume. These could be projects that are personal for you, or they could be projects that you did for your job at work.

I like to have my portfolio be an extra couple pages but you can have a link in your resume that leads to a website that has your portfolio, especially if your projects are more software and less hardware. Anyways, whether your porfolio is on a website or on a PDF, I like to show images of what it is. Since it's a hardware project, I include images of the CAD that I did, but it's also important to include an actual image of the project to show what it looked like, and that you can actually build something. Because anyone can jump into CAD software and start designing something, but a good engineer is one that can design things that can actually be built!

Also in my portfolio is where I go into a lot more detail with the "**what**", "**how**" in the results aspect of my projects. For this particular project, which was called **a centrifuge tube reader**, I designed and fabricated a device that reads the sediment and water quantity in oil with 95% accuracy. The way I did that was by using sheet metal features in **Solidworks**. Finally, the result of this project was that the design fulfilled its purpose with 97% accuracy. First is the 80% that existed previously when readings were done by humans.
Another example of a project in my portfolio was this thermostat packaging that I did for **ecobee**. So if you order a thermostat from **ecobee** it comes in this really nice packaging, and the unboxing of it is really satisfying. However, **ecobee** also sells thermostats to contractors who are working on building new houses. These contractors would receive these thermostats in this really nice packaging. But they didn't actually care about this nice packaging and they just wanted the thermostat in one piece. So because they didn't care about the nice packaging and the nice packaging was kind of expensive, I worked on designing and building this packaging that would help keep the thermostat safe against drops and impact, but would be very very cheap. So that's the **what** of this project. The **how** aspect was that I did this by using **Solidworks** to design the outer box, and I was in contact with manufacturers in China to fabricate this packaging. The outcome was that I was able to reduce production costs by 62% and I built strong relationships with Chinese manufacturers, which is actually really really important when you're building hardware products like this. Also notice how I have both CAD images and actual images of the box to show the hiring manager looking through my resume that I'm capable of actually building my designs!

The final project example I want to talk about on my resume is one called **Hapee**. The last two projects were ones I did at work as part of my job, but **Hapee** was one I worked on personally with a few friends. This project is something that a lot of interviewers usually ask me about when I'm interviewing with them because it's pretty interesting, and the problem that I'm solving is kind of unique. So what is **Hapee**? It's a toilet attachment that analyzes your pee before it's flushed away, to allow you to track your health and detect any possible diseases in the early stages. And because I'm kind of working with engineering around pee, interviewers tend to find that kind of interesting, so they're really curious to know more about it. So how did my friends and I create something like this? Well, I created 3D CAD models and 2D engineering drawings using **Fusion360** of what the project would look like. You can see the CAD in these two images here. To build it I used an **Arduino** with some sensors as well as a 3D printer. You can see the prototype in the third image over here. I also labelled all the components of this project, [9]**so** it's easier to understand what's going on when a hiring manager is reading my resume. To show that it actually worked I demonstrate that in the results section. The outcome of this project was that I was able to output urine pH and hydration levels with a 95% accuracy, and was able to provide users with accurate predictions on dehydration levels and their risk of developing kidney stones.

It's a project that I'm actually really proud of, and if you're curious to learn a little bit more about it, I'll put a link in the video description where you can actually see this project in action. You'll notice out of all my portfolio projects, the one I talked about in most detail was my personal one rather than my work ones. That's because some startups and some larger companies tend to be kind of secretive, and they don't allow you to share a lot of stuff that they're working on. But with my personal project I can talk about whatever it is I want to talk about.

So basically what I'm trying to say is, learn a bunch of skills, then work on personal projects that use those skills. Put those personal projects in a portfolio, and then share that portfolio with a a hiring manager or apply to jobs online. Because that is what will make you signed up and get noticed when you're applying to jobs. But that's it. This was the resume and portfolio that got me my engineering job at Tesla this past summer.

[9] Notice that the word '**so**' has **2** meanings, and having a comma or not determines which meaning:
If we write, " I studied Fluid dynamics all night, **so** I could pass the test" '**so**' means '**therefore**'. If we take away the comma and write: "I studied Fluid Dynamics all night **so** I could pass the test (i.e. without a comma, it means **'in order to'**.)

Übersetzung des Videotranskripts auf Seiten 62-65

Im vergangenen Sommer habe ich bei Tesla als Konstruktionsingenieur gearbeitet. In diesem Video werde ich Ihnen den Lebenslauf und das Portfolio vorstellen, die mir das Vorstellungsgespräch und schließlich das Stellenangebot eingebracht haben.

Wenn Sie sich meine Lebensläufe ansehen, werden Sie feststellen, dass ich sie gerne in diesem zweispaltigen Format strukturiere. Eine der häufigsten Fragen, die einem beim Anblick eines solchen Lebenslaufs in den Sinn kommt, lautet: Wird das ATS diesen Lebenslauf lesen können?

Das ATS ist ein System, mit dem Unternehmen Ihren Lebenslauf automatisch lesen, wenn Sie sich online auf Stellen bewerben. Wenn das System Ihren Lebenslauf lesen kann und Ihr Lebenslauf alles enthält, wonach das Unternehmen, bei dem Sie sich bewerben, sucht, wird es Ihren Lebenslauf an einen Personalverantwortlichen weiterleiten, der sich Ihren Lebenslauf ansieht. Wenn das ATS Ihren Lebenslauf jedoch nicht lesen kann, wird es ihn auch nicht an diese Menschen weiterleiten, so dass Sie nicht einmal die Chance haben, dass Ihr Lebenslauf geprüft wird. Um sicherzustellen, dass Ihr Lebenslauf von einem ATS gelesen werden kann, gibt es eine Website, die jemand erstellt hat, auf der Sie Ihren Lebenslauf eingeben können und die Ihnen sagt, ob er lesbar ist. Sie ist übrigens völlig kostenlos, und ich werde einen Link dazu in die Beschreibung aufnehmen. Wenn Sie es mit Ihrem eigenen Lebenslauf ausprobieren möchten.

Wie auch immer, sehen wir uns den Abschnitt über meine Fähigkeiten im Lebenslauf an. Da ich mich auf Stellen im Bereich der mechanischen Konstruktion bewerbe, möchte ich meine Fähigkeiten in drei Kategorien unterteilen: CAD, Mechanik sowie Elektrik und Software. In der Kategorie CAD führe ich alle Softwareprogramme auf, mit denen ich Erfahrung habe, wie SOLIDWORKS, CATIA, Nx, AutoCAD und Arena Solutions. Auch für Tesla ist CATIA sehr wichtig, da dies die am häufigsten verwendete CAD-Software in diesem Unternehmen ist. Seltsamerweise habe ich aus irgendeinem Grund die Adobe Creative Suite in diesen Abschnitt aufgenommen, aber ich weiß nicht, warum ich das getan habe. Für die Stellen, auf die ich mich beworben habe, ist das überhaupt nicht erforderlich.

Jedenfalls habe ich in der Kategorie Mechanik alle meine Kenntnisse im Maschinenbau aufgeführt, die nichts mit CAD-Software zu tun haben. Dazu gehören der Umgang mit Werkzeugen wie 3D-Druck, die Durchführung von DfM und DfA in meinen Entwürfen sowie die Toleranzanalyse. Das sind Fähigkeiten, die für Maschinenbauberufe wirklich wichtig sind. Normalerweise hat jede technische Disziplin ihre eigenen Fähigkeiten, die sehr wichtig sind.

Wenn Sie wissen möchten, woher ich weiß, welche Fähigkeiten ich erlernen muss und welche ich in meinen Lebenslauf aufnehmen muss, um mich von anderen abzuheben, hier ist die Antwort:
Ich habe mich wahrscheinlich auf Tausende von Stellen beworben, so dass ich Muster erkennen konnte, welche Fähigkeiten in vielen Stellenbeschreibungen, die ich las, am häufigsten auftauchten, so dass ich darauf achtete, diese Fähigkeiten zu lernen und sie schließlich in meinen Lebenslauf aufzunehmen.

Wie auch immer, der letzte Teil des Kompetenzbereichs meines Lebenslaufs ist "Elektrotechnik und Software". Darunter habe ich einige grundlegende nicht-mechanische Fähigkeiten aufgeführt, wie C++, MATLAB sowie Löten und Verdrahten. Es ist ein ziemlich kleiner Abschnitt, da die darin enthaltenen Fähigkeiten für die Art von Stellen, auf die ich mich beworben habe, nicht so wichtig sind.

Kommen wir nun zu den persönlichen Projekten in meinem Lebenslauf. Dies ist ein kleiner Abschnitt, da er nicht so wichtig ist wie der Abschnitt über meine Berufserfahrung. Er soll zeigen, dass ich ein echtes Interesse an der Technik habe. Ich stelle jedoch sicher, dass ich in meinem Portfolio ausführlicher über meine Projekte berichte. Wenn Sie allerdings nur wenig Berufserfahrung haben, sollte Ihr Projektteil viel länger sein als meiner, da er den Mangel an Berufserfahrung ausgleichen muss.

Lassen Sie uns nun über die Ausbildung sprechen. Ich stelle diesen Abschnitt gerne an den Schluss, denn Arbeitgeber im Ingenieurwesen, insbesondere bei Tesla, interessieren sich nicht wirklich für Ihre Noten oder dafür, wo Sie studiert haben. Sie interessieren sich viel mehr für Ihre tatsächliche Berufserfahrung. Wie auch immer, in meinem Abschnitt über die Ausbildung habe ich nur meinen Abschluss, das Jahr meines Abschlusses und meinen Gesamtdurchschnitt angegeben. Du musst deinen Durchschnitt aber nicht angeben, wenn du das nicht willst.

Als Nächstes kommt der Abschnitt "Außerschulische Aktivitäten" in meinem Lebenslauf. Dieser Abschnitt ähnelt dem Abschnitt über die Projekte insofern, als er nicht obligatorisch ist, aber dennoch nützlich sein kann. In meinen Praktika hatte ich nicht viel Erfahrung im Umgang mit Werkzeugen wie Bohrern, Fräsen und Drehbänken, also habe ich das in meinen außerschulischen Bereich aufgenommen. Auch hier gilt: Wenn Sie keine Berufserfahrung haben, sind Ihre

außerschulischen Aktivitäten und Projekte sehr wichtig, und Sie müssen viel ausführlicher darüber sprechen, um die fehlende Berufserfahrung auszugleichen.
Wie Sie sehen, lege ich auch bei meinem Lebenslauf Wert auf das Design und versuche, ihn optisch ansprechend zu gestalten. Um ehrlich zu sein, glaube ich nicht, dass das für Personalchefs, die Ihren Lebenslauf lesen, allzu wichtig ist, solange Ihr Lebenslauf nicht so aussieht. Ein schlichtes und einfaches Design wie dieses reicht völlig aus. Als ich mich jedoch mit diesem Lebenslauf bei einigen Start-ups beworben habe, sagten sie mir, dass ihnen dieses Design wirklich gefiel und ich mich dadurch abhob. Aber größeren Unternehmen war das egal. Wenn du deinen Lebenslauf so gestalten willst, dass er ähnlich aussieht wie meiner, verwende ich persönlich Canva; es ist einfach, kostenlos und sie sponsern mich nicht, um das zu sagen. Ich finde es einfach ziemlich cool. Ich werde meinen Lebenslauf in der Videobeschreibung verlinken, falls Sie ihn sich genauer ansehen möchten, um sich für Ihren eigenen Lebenslauf inspirieren zu lassen.

Werfen wir nun einen Blick auf den wohl wichtigsten Abschnitt Ihres Lebenslaufs, nämlich das Anhängen eines Portfolios. Wenn Sie eines aus diesem Video mitnehmen, dann ist es, dass Sie Ihrem Lebenslauf ein Portfolio beifügen müssen, um sich von der Masse abzuheben. Es baut im Wesentlichen auf den Projekten auf, über die Sie bereits auf der ersten Seite Ihres Lebenslaufs gesprochen haben. Dabei kann es sich um persönliche Projekte handeln oder um Projekte, die Sie für Ihre Arbeit durchgeführt haben.

Ich mag es, wenn mein Portfolio ein paar Seiten länger ist, aber Sie können einen Link in Ihrem Lebenslauf haben, der zu einer Website mit Ihrem Portfolio führt, vor allem, wenn Ihre Projekte mehr Software und weniger Hardware sind. Unabhängig davon, ob Ihr Portfolio auf einer Website oder in einer PDF-Datei zu finden ist, zeige ich gerne Bilder davon, was es ist. Da es sich um ein Hardware-Projekt handelt, füge ich Bilder des CAD-Programms bei, das ich erstellt habe, aber es ist auch wichtig, ein tatsächliches Bild des Projekts beizufügen, um zu zeigen, wie es aussah und dass man tatsächlich etwas bauen kann. Denn jeder kann sich in eine CAD-Software setzen und etwas entwerfen, aber ein guter Ingenieur ist jemand, der Dinge entwerfen kann, die auch tatsächlich gebaut werden können.
In meinem Portfolio gehe ich auch sehr viel detaillierter auf das "Was" und das "Wie" in Bezug auf die Ergebnisse meiner Projekte ein. Für dieses spezielle Projekt, ein Zentrifugenröhrchen-Lesegerät, habe ich ein Gerät entworfen und hergestellt, das die Sediment- und Wassermenge in Öl mit 95 %iger Genauigkeit misst. Dazu habe ich die Blechfeatures in Solidworks verwendet. Das Ergebnis dieses Projekts war, dass der Entwurf seinen Zweck mit 97 % Genauigkeit erfüllte. Erstens, die 80%, die es gab, als die Ablesungen noch von Menschen durchgeführt wurden.

Ein weiteres Beispiel für ein Projekt in meinem Portfolio war diese Thermostatverpackung, die ich für ecobee entworfen habe. Wenn man ein Thermostat von ecobee bestellt, wird es in einer wirklich schönen Verpackung geliefert, und das Auspacken ist sehr befriedigend. Allerdings verkauft ecobee auch Thermostate an Bauunternehmen, die neue Häuser bauen. Diese Bauunternehmen erhielten die Thermostate in einer wirklich schönen Verpackung, aber die schöne Verpackung war ihnen eigentlich egal, sie wollten nur den Thermostat in einem Stück haben. Da sie sich also nicht um die schöne Verpackung kümmerten und die schöne Verpackung ziemlich teuer war, arbeitete ich daran, eine Verpackung zu entwerfen und zu bauen, die den Thermostat vor Stürzen und Stößen schützen würde, aber sehr billig wäre. Das ist also das "Was" dieses Projekts. Das "Wie" bestand darin, dass ich die äußere Verpackung mit Solidworks entwarf und mich mit Herstellern in China in Verbindung setzte, um diese Verpackung zu fertigen. Das Ergebnis war, dass ich die Produktionskosten um 62 % senken konnte und gute Beziehungen zu chinesischen Herstellern aufgebaut habe, was bei der Herstellung von Hardwareprodukten wie diesem wirklich sehr wichtig ist.

Beachten Sie auch, dass ich sowohl CAD-Bilder als auch tatsächliche Bilder der Verpackung habe, um dem Personalverantwortlichen, der sich meinen Lebenslauf ansieht, zu zeigen, dass ich in der Lage bin, meine Entwürfe tatsächlich zu bauen.

Das letzte Projektbeispiel, das ich in meinem Lebenslauf erwähnen möchte, heißt Hapee. Die letzten beiden Projekte habe ich im Rahmen meiner Arbeit durchgeführt, aber Hapee war ein Projekt, an dem ich persönlich mit ein paar Freunden gearbeitet habe. Viele Interviewer fragen mich nach diesem Projekt, weil es sehr interessant ist und das Problem, das ich damit löse, ziemlich einzigartig ist. Also, was ist Hapee? Es ist ein Toilettenaufsatz, der dein Urin analysiert, bevor es weggespült wird, damit du deine Gesundheit verfolgen und mögliche Krankheiten im Frühstadium erkennen kannst. Und da ich mich mit Technik rund um das Thema Urin beschäftige, finden die Interviewer das sehr interessant und sind sehr neugierig, mehr darüber zu erfahren. Wie haben meine Freunde und ich also so etwas geschaffen? Nun, ich habe mit Fusion360 3D-CAD-Modelle und 2D-Konstruktionszeichnungen erstellt, die zeigen, wie das Projekt aussehen würde. Sie können die CAD-Modelle in diesen beiden Bildern hier sehen. Zum Bau habe ich einen Arduino mit einigen Sensoren sowie einen 3D-Drucker verwendet. Der Prototyp ist auf dem dritten Bild hier zu sehen. Ich habe auch alle Komponenten dieses Projekts beschriftet,

Wie Sie sehen, lege ich auch bei meinem Lebenslauf Wert auf das Design und versuche, ihn optisch ansprechend zu gestalten. Um ehrlich zu sein, glaube ich nicht, dass das für Personalverantwortliche, die Ihren Lebenslauf lesen, eine große Rolle spielt, solange Ihr Lebenslauf nicht wie dieser aussieht. Ein schlichtes und einfaches Design wie dieses reicht völlig aus. Als ich mich jedoch mit diesem Lebenslauf bei einigen Start-ups beworben habe, sagten sie mir, dass ihnen dieses Design wirklich gefiel und ich mich dadurch abhob. Aber größeren Unternehmen war das egal. Wenn du deinen Lebenslauf so gestalten willst, dass er ähnlich aussieht wie meiner, verwende ich persönlich Canva; es ist einfach, kostenlos und sie sponsern mich nicht, um das zu sagen. Ich finde es einfach ziemlich cool. Ich werde meinen Lebenslauf in der Videobeschreibung verlinken, falls Sie ihn sich genauer ansehen möchten, um sich für Ihren eigenen Lebenslauf inspirieren zu lassen.

Werfen wir nun einen Blick auf den wohl wichtigsten Abschnitt Ihres Lebenslaufs, nämlich das Anhängen eines Portfolios. Wenn Sie eines aus diesem Video mitnehmen, dann ist es, dass Sie Ihrem Lebenslauf ein Portfolio beifügen müssen, um sich von der Masse abzuheben. Es baut im Wesentlichen auf den Projekten auf, über die Sie bereits auf der ersten Seite Ihres Lebenslaufs gesprochen haben. Dabei kann es sich um persönliche Projekte handeln oder um Projekte, die Sie für Ihre Arbeit durchgeführt haben.

Ich mag es, wenn mein Portfolio ein paar Seiten länger ist, aber Sie können einen Link in Ihrem Lebenslauf haben, der zu einer Website mit Ihrem Portfolio führt, vor allem, wenn Ihre Projekte mehr Software und weniger Hardware sind. Unabhängig davon, ob Ihr Portfolio auf einer Website oder in einer PDF-Datei zu finden ist, zeige ich gerne Bilder davon, was es ist. Da es sich um ein Hardware-Projekt handelt, füge ich Bilder des CAD-Programms bei, das ich erstellt habe, aber es ist auch wichtig, ein tatsächliches Bild des Projekts beizufügen, um zu zeigen, wie es aussah und dass man tatsächlich etwas bauen kann. Denn jeder kann sich in eine CAD-Software setzen und etwas entwerfen, aber ein guter Ingenieur ist jemand, der Dinge entwerfen kann, die auch tatsächlich gebaut werden können.
In meinem Portfolio gehe ich auch sehr viel detaillierter auf das "Was" und das "Wie" in Bezug auf die Ergebnisse meiner Projekte ein. Für dieses spezielle Projekt, ein Zentrifugenröhrchen-Lesegerät, habe ich ein Gerät entworfen und hergestellt, das die Sediment- und Wassermenge in Öl mit 95 %iger Genauigkeit misst. Dazu habe ich die Blechfeatures in Solidworks verwendet. Das Ergebnis dieses Projekts war, dass der Entwurf seinen Zweck mit 97 % Genauigkeit erfüllte. Erstens, die 80%, die es gab, als die Ablesungen noch von Menschen durchgeführt wurden.

Es ist ein Projekt, auf das ich wirklich stolz bin, und wenn ihr mehr darüber erfahren wollt, findet ihr in der Videobeschreibung einen Link, unter dem ihr das Projekt in Aktion sehen könnt. Sie werden feststellen, dass von all meinen Portfolio-Projekten dasjenige, über das ich am ausführlichsten spreche, mein privates Projekt ist und nicht mein berufliches. Das liegt daran, dass einige Startups und größere Unternehmen dazu neigen, sehr geheimnisvoll zu sein und nicht viel von dem preiszugeben, woran sie gerade arbeiten. Aber bei meinem persönlichen Projekt kann ich über alles reden, worüber ich reden möchte. Was ich damit sagen will, ist, dass man sich eine Reihe von Fähigkeiten aneignen und dann an persönlichen Projekten arbeiten sollte, die diese Fähigkeiten nutzen. Stellen Sie diese persönlichen Projekte in einem Portfolio zusammen, und zeigen Sie dieses Portfolio dann einem Personalverantwortlichen oder bewerben Sie sich online auf Stellen. Denn nur so werden Sie unter Vertrag genommen und fallen auf, wenn Sie sich auf Stellen bewerben. Aber das war's auch schon. Mit diesem Lebenslauf und dieser Mappe habe ich im letzten Sommer eine Stelle als Ingenieur bei Tesla bekommen.

PRESENTATIONS

EIT Presentation

Evaluation Form

Date _____

Time begin _____

Time end _____

Total time _____

Presenter Name **Matriklnr**

Presentation Title

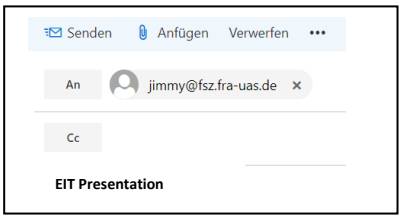
Evaluator **Total Score**

Criteria	Performance Level 0	Performance Level 1	Performance Level 2	Performance Level 3	Performance Level 4
Knowledge / understanding	Presented false or very obvious and simplistic facts, terms, concepts and relationships	Presentation demonstrated some knowledge of basic facts concepts and relationships	Presentation demonstrated some knowledge of relevant facts, terms, concepts and relationships	Presentation demonstrated considerable knowledge of relevant facts and relationships	Presentation demonstrates thorough mastery of relevant facts, terms, concepts and relationships
Communication (oral)	Language delivery consisted of rote recitation from a written or memorised script	Language and/or delivery resulted in information being ineffectively communicated. Frequent intrusive pronunciation, vocabulary and grammar errors reveal poor preparation and interfere with message being conveyed	Language and/or delivery resulted in information being communicated with limited effectiveness. Lack of control of pronunciation, vocabulary and grammar errors distracted from message being conveyed	Language and/or delivery resulted in information being effectively communicated. Some pronunciation, vocabulary and grammar errors evident which interfered minimally with message being conveyed	Language and/or delivery resulted in information being communicated orally in a highly effective manner. Pronunciation and grammar errors, if evident, are rare and unobtrusive.
Communication (visual)	Organisation? Did not meet time requirements	Presentation was organised in an ineffective manner unaided by signposting or linking between sections	Presentation was organised in a somewhat effective manner. Some attempts at signposting and linking between sections	Presentation was effectively organised with generally appropriate signposting and linking between sections	Presentation was organised in a highly effective manner with excellent flow, signposting and linking between sections
Organisation / timing / linking	Organisation? Did not meet time requirements	Presentation was organised in an ineffective manner unaided by signposting or linking between sections	Presentation was organised in a somewhat effective manner. Some attempts at signposting and linking between sections	Presentation was effectively organised with generally appropriate signposting and linking between sections	Presentation was organised in a highly effective manner with excellent flow, signposting and linking between sections
Audience contact	Presenter appeared oblivious to audience	Despite some limited eye contact, audience feels its own life force slowly ebbing away	In addition to usually addressing audience, the presentation generated some limited interest and/or participation	Presentation addressed audience specifically and generated considerable interest and/or participation	Presentation addressed audience specifically and generated a great amount of interest and/or participation
Questions	Irrelevant or incomprehensible	Fairly irrelevant and/or quite incomprehensible	Relevant and comprehensible	Very good logical question	Superb question
No. of questions asked	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

GUIDELINES for EIT Presentation

In EIT you have to design and give a minimum 6 minute presentation.

1. **<u>DEADLINE for submission of topic of presentation</u>: November 23 (Thu.) 2023 (noon)**
   After deciding on your topic, send your topic suggestion via email to Matthew at **cohn@fsz.fra-uas.de** .
   When you send your submission to Matthew, please write in the Subject Line: **EIT Presentation**



2. **<u>When should you start to design your presentation</u>?**
   After you have sent your submission topic **<u>and</u>** received an **"OK" email** from your teacher, you can proceed to design your presentation.

3. **Presentation topic**
   - Any topic of your choice in: 1.) engineering, 2.) IT, or 3.) business is acceptable.
   - Your presentation must be at least 6 minutes long.
   - Your presentation must be in English. ☺
   - You will give your presentation **individually**.
   - Your presentation should be shown on PPT or equivalent presentation software.
   - You may NOT use video material although **extremely** short animated gifs, etc. would be possible!
   - Images, graphics and graphs, etc., are, of course, crucial to use.

4. **Questions**
   After each presentation there will be up to 10 minutes of questions where the audience will ask probing and challenging questions of your tech-business project.
   <u>Every</u> member of the audience will have the chance to ask the presenters questions about their technical presentation. Your questions should be relevant to the presentation, logical, and in good English. Your teacher will call upon members of the audience without warning at the end of the presentation during Question Time to ask challenging questions to the presenters.

5. **Technology for the presentation**
   Your technical stuff, e.g. cams, mics, etc., should be prepared very well. The presentation should **<u>not</u>** happen via your iPhone. You are responsible for the sound quality, slide quality and other technical issues. If there are any technical problems, that is your responsibility and you may fail the module.

6. **When and with whom?**
   You will present alone but your colleagues will be your audience.
   We will decide which day you are presenting in the class on 21 November.

7. **When?**
   You will receive the date of your presentation in the 13th class on **Tuesday 28 November**.

8. **Presentation style**
   - Your presentation must **<u>NOT</u>** be read - you must memorise the basic content: Reading your presentation is an immediate FAIL!
   - You will lose many percentage points if you talk down to your notes.

Below are some presentations <u>with questions</u>.

Watch part OR all of each video and think about answers to the questions.

- **https://www.youtube.com/watch?v=gzMXdxFz8Hc** **POOR ENGLISH**
  *A non-native English speaker giving a presentation: Great slides, but his English is difficult to understand due to his pronunciation/intonation. He also uses **almost no plurals** throughout his presentation, e.g. ((0:26-29) "... 6 hour before they run out." It should be" ... 6 hour**S**..."*
  - Any advice for him?
  - Perhaps he should speak more slowly?

- **https://www.youtube.com/watch?v=N2pkdGUFalg** **VOICE CONTROL**
  This is a German presentation but you can notice how well this woman engages the audience during her presentation. That is great because it gets the audience excited and interested.
  - *Is her voice interesting to listen to, and if you have a boring voice, how can you make it more interesting?*
  - *But what don't you like about her presentation?*
  - *She does not dance around the stage and moves her hands in a very controlled way. Is that good?*

- **https://www.youtube.com/watch?v=RuUcKbfyUuc** **MEMORISING CONTENT**
  Here is a woman talking about her industrial design job. She obviously has a problem remembering her content so she uses her phone. In this way, she maintains some eye contact with her audience, yet has her notes available. Sometimes nervousness can make us forget what we want to say;
  - Do you think her solution for remembering her presentation works effectively or ruins her presentation?
  - What are some other solution if someone has nerves when giving a presentation?

- **https://www.youtube.com/watch?v=bqgPSCVq5Wg** **LOOKING AT YOUR AUDIENCE**
  The presenter here tries to use humour and he looks at the audience without notes.
  - What do you think is good about his presentation and what do you think is not so good?

- **https://www.youtube.com/watch?v=Js6r7vfl3oQ** **PRONUNCIATION/GRAMMAR**
  Here is a presentation from a student who designed his own product. Unfortunately, we cannot see the speaker as he speaks. However, we can see his slides. Switch on the CC because his English is not always so good. Check for example this mistake(1:00-1:03): "I took it to a local manufacturer to see what can I do". That should be "I took it to a local manufacturer to see what I could do."
  - What do you like or not like about his slides?
  - How could he have prepared his presentation better considering he has problems with grammar and pronunciation?
  - Does bad English grammar really matter? To what extent does it matter?

- **https://www.youtube.com/watch?v=5WhmMhbJDjM** **NATIVE SPEAKER**
  A native English-speaker engineer is here giving a presentation about his engineering design projects.
  - Can you list 3 good things and 1 bad thing about his presentation?

- **https://www.youtube.com/watch?v=3aGh4YPJ60Y** **NATIVE SPEAKER USING HUMOUR**
  *A native English-speaker engineer is here giving a presentation explaining about a **jet cutter**. Notice how a bit of humour makes the presentation interesting. A couple of jokes:*
  1. (1:40-42) "... my business partner, Mike. .....on the right he's pretending to inspect a part."
  (It's funny because the presenter is explaining that the photo is just acting and not really authentic. That honestyl makes the audience laugh. And that allows him then to give some statistics which are dry information.)
  2. (1:55-59) "This on the other hand is totally different. We're not fussy who our clients are."
  This is a joke and everyone laughs because the speaker is English and the flag is Scottish. So he is saying that he even has Scottish clients. You can imagine such a joke from someone from Hessen saying he even has customers from Bavaria (Bayern).
  - Is it good to use humour when giving a presentation?
  - Trying to say something funny in a foreign language, particularly in a new culture is risky. Making a mistake with a joke so that the audience do not understand it or simply do not think it's funny could be a disaster for your presentation.
  - How do you make sure that your humour works?

Other great presentations

All videos are also available on our CampUAS page

Sir Ken Robinson: Do schools kill creativity?
Youtube LINK

Flora Hardy: Building a sustainable (bamboo) future
Youtube LINK

James Veitch: This is what happens when you reply to spam email.
Youtube LINK

Amy Cuddy: Your body language may shape who you are.
Youtube LINK

Richard Turere: Saving the lions
Youtube LINK

THE CLASSIC: Steve Job's presentation of the iPhone 2007
Youtube LINK

Presentation Structure:
13 things you should think about when giving an online presentation.

1. **Connect with your Audience**

- It's about THEM **not** YOU.
- Make it easy to understand.
- Show passion for the topic

---

2. **Nervousness**

- Some nervousness is good
- But... don't be too nervous.
- Practice a lot. Really!
- Mistakes are usually not noticed.
- Some nervousness is energising.

---

3. **Keep it Simple**

- Concentrate on Core Message.
- A few key points
- Be brief.
- Main message could be a 30-second 'elevator summary'.
- Or the main message could be summarised in 15 words.
- Don't go off on a side road.

---

4. **Equipment**

- You will lose 5 percentage points automatically if your presentation is not technically ready.
- Don't fumble with your ZOOM or appear unprofessional with your software, platform or hardware.
- Come early, really early.
- Run through your pechakucha slideshow beforehand and make sure there won't be any glitches on the big day.

---

5. **Your face, your eyes, your appearance**

- If you smile, it actually makes YOU less nervous.
- Smiles make the audience relax.
- The audience needs to see you, so check your facial lighting.
- Eye contact with your camera - it makes people feel you are watching them.
- Avoid looking at notes.
- Don't read the slide!
- Don't turn your eyes away from the audience .
- ZOOM backgrounds can end up looking weird, as though your skull has wings or your neck is like a sumo wrestler's.

---

6. **Start strongly**

- The beginning is crucial: it is the hook!
- Your audience will give you only a few seconds of grace while they check out if you are worth listening to.
- After that... they switch off.
- Don't waste time explaining who you are.
- Start by entertaining them.
- Try a very quick story or a fantastic image.

7. **Slides and the**

- Don't use a font size below 30pt.
- Don't put too much information on one slide.
- Watch the way Steve Jobs used slides!
- Extra info can go on a handout

---

8. Tell very short stories

- People like stories.
- Stories help people pay attention and remember.

---

9. Voice

- Vary speed.
- Vary pitch.
- Lower your voice at the end of phrases.
- Slow down.

---

10. Body Language

- 3/4 of communication is non-verbal.
- Avoid:
  crossed arms,
  hands held behind your back or in your pockets,
  pacing the stage.
- Make your gestures open and confident.
- Dress reasonably.

---

11. Relax, breathe, enjoy

- Slow breathing down.
- Breathe fully.
- Pause for breath occasionally.

---

12. Preparation

- Preparation removes anxiety.
- For a pechakucha, memorisation is essential
- Practice with a friend.
- Practice with an enemy.
- Practice with your cat/dog/armadillo.
- Practice with a mirror.

---

13. Apologies

- Don't apologise for nerves.
- Apologise only for mistakes, **but** only if really necessary.

---

14. Notes

- Best is if you can memorise everything, as it is a pechakucha presentation.
- But... if you do use notes, use them sparingly.
- Key words are useful.
- Sentences are a bad idea.
-

Signpost language for presentations

Section of presentation	Signpost language
Introducing the topic	The subject/topic of my talk is ... I'm going to talk about ... My topic today is… My talk is concerned with ...
Overview (outline of presentation)	I'm going to divide this talk into four parts. There are a number of points I'd like to make. Basically/ Briefly, I have three things to say. I'd like to begin/start by ... Let's begin/start by ... First of all, I'll... … and then I'll go on to … Then/ Next ... Finally/ Lastly ...
Finishing a section	That's all I have to say about... We've looked at... So much for...
Starting a new section	Moving on now to … Turning to... Let's turn now to … The next issue/topic/area I'd like to focus on … I'd like to expand/elaborate on … Now we'll move on to... I'd like now to discuss... Let's look now at...
Analysing a point and giving recommendations	Where does that lead us? Let's consider this in more detail... What does this mean for...? Translated into real terms... Why is this important? The significance of this is...
Giving examples	For example,... A good example of this is... As an illustration,... To give you an example,... To illustrate this point...

Summarising and concluding	To sum up ... To summarise... Right, let's sum up, shall we? Let's summarise briefly what we've looked at... If I can just sum up the main points... Finally, let me remind you of some of the issues we've covered... To conclude... In conclusion ... In short ... So, to remind you of what I've covered in this talk, … Unfortunately, I seem to have run out of time, so I'll conclude very briefly by saying that ….. I'd like now to recap...
Introducing Visuals	As you can see, Let's take a look at… On this chart, you can see… Let's have a look at…
Highlighting Information	I'd like to draw (your) attention to the fact that… I'd like to point out that… I'd like to highlight the fact that… I'd like you to focus on… If you look closely, you will notice that…
Paraphrasing and clarifying	Simply put... In other words..... So what I'm saying is.... To put it more simply.... To put it another way....
Invitation to discuss / ask questions	I'm happy to answer any queries/ questions. Does anyone have any questions or comments? Please feel free to ask questions. If you would like me to elaborate on any point, please ask. Would you like to ask any questions? Any questions?