

Hinweise zum Ausfüllen und Versenden des Europass Lebenslaufes (Europass CV)

Beispiel für „Work experience – Microtechnologist“:

Dies ist der wichtigste Abschnitt für die aufnehmende Institution. Er entscheidet im Wesentlichen darüber, ob Sie angenommen werden oder nicht.

Hier nennen Sie die wesentlichen Arbeitstechniken und Verfahren, die Sie während Ihrer Ausbildung gelernt haben / lernen werden.

Schreiben Sie nicht nur die Abkürzungen von Analyseverfahren (z.B. AAS), sondern tragen Sie auch die ganzen Bezeichnungen ein.

Das Schriftfeld wird automatisch entsprechend dem Textumfang vergrößert.

Bitte übernehmen Sie diese Liste nicht „blind“, sondern nennen Sie nur tatsächlich erlernte Techniken, ergänzen Sie ggf. hier nicht aufgeführte Techniken in Ihrem Lebenslauf.

Mikrotechnologe, Mikrotechnologin

Electrical engineering:

- electrical units and their relations
- analogous and digital signals
- measuring electrical units
- direct current circuits and alternating current circuits
- active and passive components/control elements
- bipolar and unipolar technology
- amplification, basic circuits in amplifying technology
- basic logical circuits and storage cells
- resistance
- frequency
- capacity
- electrostatic discharge
- electrical and magnetic field
- coils
- electromagnetic induction
- electromagnetic compatibility (EMC) and electromagnetic interference (EMI)
- conductors, semiconductors, dielectrics
- insulation
- semiconductor technology:
 - silicon
 - poly-crystalline and mono-crystalline semiconductors
 - flawed semiconductors

- discrete semiconductors
- power semiconductors
- integrated semiconductors
- application-specific integrated circuits (ASICs)
- optoelectronic semiconductors
- optoelectronic displays

- PN-junction
- digital electronic, operational amplifier

- applications and their structure:
 - diode
 - condenser
 - alternator
 - bipolar transistor (switch, amplifier, circuitry, drafting the layout, Lorentz force, Hall effect, oscilloscope, measuring, documentation/minutes, printed circuit board assembly, commissioning)
 - field-effect transistor (basic circuit arrangement, junction gate field-effect transistor, depletion layer, condenser, amplifier)

- measuring and controlling
- LabVIEW (Laboratory Virtual Instrument Engineering Workbench – visual programming language)
- data sheets
- health and safety regulations

Microprocess engineering:

- microsystem technology:
 - thick film technique
 - thin film technique
 - hybrid technology
 - surface mounting of components (surface mounted devices - SMD)
 - lithographic deep etching
 - electroplating and moulding techniques

- wafer manufacturing:
 - quartz
 - silicon
 - raw silicon manufacture, zone cleaning
 - single crystal manufacture (Czochralski process, float zone silicon, crystallographic defects)
 - wafer separation
 - wafer lapping
 - edge rounding
 - chemical mechanical polishing (CMP)
 - ion implantation

- layer deposition:
 - oxidation
 - redox reaction
 - production of oxide, nitride, polysilicon, metal, epitaxy and resistance layers
 - chemical vapour deposition (CVD), atmospheric CVD, low pressure CVD, plasma enhanced CVD
 - atomic layer deposition
 - physical vapour deposition (PVD)
 - epitaxy, molecular beam epitaxy (MBE)
 - evaporating
 - sputtering
 - doping
 - electrochemical deposition
 - electroplating
- etching: physical dry etching, chemical dry etching, physical-chemical dry etching, wet etching, batch etching, spray etching
- laser ablation
- joining and assembly
 - soldering (hand soldering, reflow soldering)
 - solder bumping
 - bonding (die bonding, wire bonding, ball-wedge bonding, wedge-wedge bonding)
 - assembly (mounting of chips, connection of elements, housing of components)
 - packaging (flip chip, tape automated bonding TAB, epoxy resins, gang ball placement – GBP)
 - testing of function → quality management
- cleanroom:
 - classification of cleanrooms
 - cleanroom conditions
 - causes, kinds and effects of impurities
 - cleanroom garments
 - behaviour in a cleanroom
 - particle measurement
 - ventilating systems (laminar flow, turbulent air flow)
 - filters (high-efficiency particulate air filter – HEPA, ultra-low penetration air filter – ULPA)
 - production of ultra-pure water
- vacuum technology:
 - vacuum
 - pressure
 - gas laws
 - kinetic theory of gases
 - ideal gas
 - pumps

- analysis of residual gas
- measuring (barometer, Penning vacuum gauge, hot-cathode vacuum gauge, Pirani vacuum gauge)
- geometrical/ray optics:
 - optical imaging
 - refraction and reflection
 - wave optics (calculation of the wavelength, optical fibres, diffraction at a double split, diffraction at a grid, interference)
 - prism, converging lens, Fresnel lens
 - the eye, sight disorders
- physical optics:
 - diffraction
 - spectra (visible spectrum, absorption spectrum, exposure spectrum)
 - electromagnetic spectrum, foci/image points of converging lenses
 - magnifying glass, microscopes, optical instruments
 - interference
 - Bessel procedure
- optical components:
 - laser
 - optical fibres
 - sensors
- lithography:
 - diffraction spectrum, diffraction grating
 - photoelectric effect
 - spectral lamp
 - photolithography (steps: (spin-)coating, baking, alignment, exposure, development, resist removal)
 - photoresists (positive resists, negative resists, image reversal resists, lift off resists)
 - photo masks
 - exposure systems (contact exposure, proximity exposure, projection exposure)
 - Moore's Law
 - Extreme Ultraviolet Lithography (EUVL)
 - LIGA ((Lithography, Electroplating, and Moulding)
 - structuring a printed circuit board
 - lamination
 - physical vapour deposition
 - plasma
- quality management/production control:
 - quality standards
 - measurement – optical methods: light microscope, confocal laser microscope, scanning electron microscope, ellipsometer, profilometer, X-ray,

- electroluminescence, photoluminescence, Bragg diffraction, substrate mapping/wafer mapping
 - measurement – non-optical methods: swinging quartz method, shear test, pull test (tensile strength test), four point probe technique
 - characteristic values and parameters, such as standard distribution, mean value, standard deviation)
 - evaluation of measured results
 - detection of faults
- applications such as diode, rectifier, transistor, various kinds of sensors, airbag, actuators, interfaces, fuel cell

Chemistry:

- official international regulations for the handling and marking of hazardous chemicals (*Globally Harmonized System of Classification*: precautionary and hazard statements)
- safety appliances
- first aid
- periodic table of the elements
- atomic structure
- chemical bonds
- alloys
- ionic crystal, crystal lattice
- manufacture of silicon
- formulating basic equations of chemical reactions
- corrosive substances, such as acids and alkalis/lyes/leaches, as well as the calculations of their concentrations
- neutralization, salts
- determination of the ph-value
- organic chemistry: solvents, carbon compounds, alcohols, polymers (titration, organic compounds, plastics, polymerization, alkanes, halogens, salts, metals, spectroscopy)
- noble gases
- reactive gases and their separation products
- application of selected chemicals in semiconductor manufacturing
- production of ultra-pure water
- recycling of waste water
- requirements for pipes and fittings
- environmentally friendly disposal of waste material