# Program of the course 'Applied Vacuum Technology'
## under auspices of the NEVAC

The course is designed especially for Master students, PhD students and Postdocs.
It covers fundamental knowledge on vacuum and practical information about operating vacuum setups in the lab.
You also have ample opportunity to discuss your own equipment with vacuum experts.

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| **When:** | June 11 – 13, 2024 |
| **Duration:** | 3 days from 09.00 till 17.00 hours |
| **Location:** | Delft University of Technology, Dept. of Applied Sciences building 22 |
| **Coordination:** | Dr. Gesa Welker, g.welker@gmx.net |
| **Lecturers:** | Dr. Dick van Langeveld, David Schijve, Dr. Gesa Welker & Marc Zuiddam |
| **Registration:** | **https://nevac.nl/aiocursus.php** |
| **Costs:** | **550 €, ex VAT, incl. book "Vacuum Science & Technology" and lunches.** |

**Topics covered during the course:**

**1) Introduction & Fundamental Aspects (Gesa Welker)**
Thermal Velocity of molecules; mean free path; adsorption / desorption; (saturated) vapor pressure

**2) Flow of gases (Gesa Welker)**
Turbulent, viscous and molecular flow; conductivities

**3) Total Pressure Gauges (Dick van Langeveld)**
Membrane gauges; heat conductivity gauges; hot- & cold cathode ionization gauges

**4) Residual Gas analysis (Dick van Langeveld)**
Magnetic deflection spectrometer; quadrupole mass spectrometer; autoresonant trap mass spectrometer

**5) Pre-Vacuum pumps (Marc Zuiddam)**
Rotary vane pump; membrane pump; scroll pump; (multistage) roots pump

**6) (Ultra) High Vacuum pumps (Marc Zuiddam)**
Turbomolecular pump; sorption pump; cryopump; Ti-sublimation pump; getter pump; sputter-ion pump

**7) Leak testing (David Schijve)**
Working principle and protocol; practical demonstration; calculation of leak rate versus pump capacity and conductance

**8) Connections & components (Dick van Langeveld)**

**9) Cleaning and working discipline (Dick van Langeveld)**

**10) Cryogenic Vacuum Technology (Gesa Welker)**
Vacuum-related cooling methods; thermal isolation; cryopumping