Certified Laser Safety Technician (CLST) Training Course

(This is an 8 page intro to the course. To sign up and take course click on link on web page.)

Topics Included

- **Module 1 – Introduction To Laser Safety**
- **Module 2 – Definitions**
- **Module 3 - Laser Safety Program**
- **Module 4 – Regulations**
- **Module 5 – Laser Safety Officer**
- **Module 6 - Personal Protective Equipment**
- **Module 7- Laser Safety Signage**
- **Module 8 -Laser Hazards**
- **Module 9 -Fire Hazards**
- **Module 10- Protection Against Radiation Exposure**
- **Module 11- Laser Safety For Healthcare Industry**

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Module 1 - Introduction to Laser Safety

- **Laser Radiation and the Electromagnetic Spectrum**
- Electromagnetic radiation is a natural phenomenon found in almost all areas of daily life, from radio waves to sunlight to x-rays. Laser radiation – like all light – is also a form of electromagnetic radiation.
- Electromagnetic radiation that has a wavelength between 380nm and 780nm is visible to the human eye and is commonly referred to as light.
- At wavelengths longer than 780nm, optical radiation is termed infrared (IR) and is invisible to the eye.

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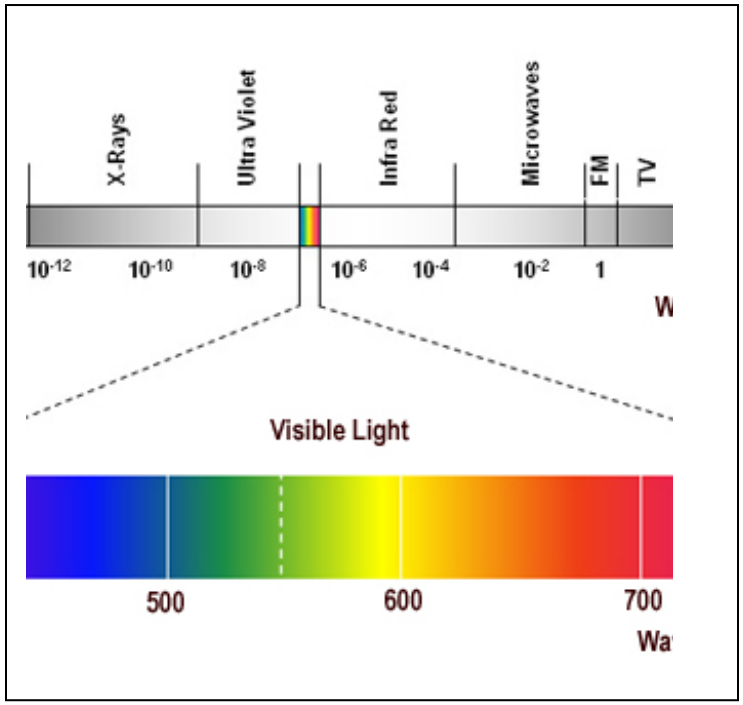
Module 1 - Introduction to Laser Safety

- At wavelengths shorter than 380nm, optical radiation is termed ultraviolet (UV) and is also invisible to the eye.

The term "laser light" refers to a much broader range of the electromagnetic spectrum that just the visible spectrum, anything between 150nm up to 11000nm (i.e. from the UV up to the far IR).



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Module 1 - Introduction to Laser Safety

- **The Fundamentals of Laser Operation**
- The word ‘laser’ is an acronym for Light Amplification by the Stimulated Emission of Radiation.
- A laser was first demonstrated in 1960 by Theodore H Maiman working at the Hughes Corporation, although the term ‘laser’ was first coined by Gordon Gould of Columbia University.

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Module 1 - Introduction to Laser Safety

- To understand how laser action occurs, one must first consider the atomic nature of matter.
- An atom consists of a central nucleus surrounded by a cloud of electrons.
- Quantum theory explains that the electrons in atoms exist in discrete energy states, and at thermal equilibrium, they are maintained in the so-called 'ground state'.

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Module 1 - Introduction to Laser Safety

- In ordinary light sources such as a filament bulb, electrical energy passing through the tungsten ribbon raises the electrons in the metal atoms into excited energy states.
- The electrons return to their ground state spontaneously and, in so doing, release packets, or quanta, of optical energy called photons.
- Atoms in ordinary light sources radiate photons independently of each other, and no phase relationship exists between them. In other words, light generated by spontaneous emission is incoherent. This lack of coherence is one important characteristic that distinguishes ordinary light sources from lasers.

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Module 1 - Introduction to Laser Safety

- Einstein was the first scientist to propose that an excited atom can return to its ground state in either of two processes, which he referred to as ‘spontaneous’ and ‘stimulated’ emission.
- The conditions for stimulated emission, and hence laser operation, require that the excited atom is prompted into emission of a photon by the application of light of the same frequency (wavelength) as that which the electron decay itself will produce.

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