Structuring and preparation of a lesson: **EAE module 1 (Adhesion and adhesives)**

time	Theme, core information, statements or questions	Learning objectives [1]	Methods (e.g. presentation/ discussion/group work)	Media/ training material
8h	Historical Background • use of adhesives (in their broadest sense) before 1900. • Industrial adoption and Expanding opportunities for adhesives (and sealants) Benefits and Limitations of Adhesive Bonding • The benefits and opportunities from the adoption of adhesive bonding • The downside of adhesive bonding: - Health and safety specific requirements - Cost implications - Lack of credibility Principles of Adhesion • A general overview of the theories of adhesion. • The importance of surface energy and how it influences the ability to produce a good quality adhesive bond. • How pretreatment affects surface energy and hence the degree of adhesion • Environmental effects on adhesive performance. Glossary of Terms • Terminologies used within the adhesive technology - Systematic examination of	To be able to understand terms of adhesive technology Know and understand the fundamentals of adhesive bonding within the context of other joining technologies, including its benefits, limitations, principles and related terminologies.	Presentation of content by - presentation Specimens with different types of adhesives Teachting text Practical demonstration Questions about the identification of the adhesive	Explanatory videos showing the difference between joints made with different adhesives. Beamer/ printed - presentation

[1] (1) Know and understand, (2) transfer and practically apply, (3) analyze and assess; (0) no learning objective; additional information

	terms used and their meanings (e.g. as defined in EN 923)			
40h	Classification • By chemical family (epoxy, silicone...) • By hardening mechanism (chemical curing, solvent evaporation, melting/cooling...) • By origin (natural, synthetic, mineral, organic...) • By end-use (wood adhesives...) • By functional types (structural, hot-melt, pressure-sensitive...) • By physical form (one or multiple components, films, tapes, pastes, liquids...). Constitution of Adhesives and Sealants • Different types of polymers and their basic properties • Adhesive modifiers function • Primers • Solvents Types of Adhesives and Seleants • Resin chemistry and Cure chemistry • Functional types • Markets and applications • Properties: - Handling and storage - Physical (prior to cure) - Process (metering, mixing, dispensing, application) - Mechanical, chemical, thermal, electrical (after cure) - Health and safety • Chemical families: - Epoxies - Phenolics	To be able to classify the adhesives according to their chemical characteristics To be able to classify the adhesives according to their physics characteristics Be able to understand the behavior of different types of adhesives	Presentation of content by - presentation Specimens with different types of adhesives Teachting text Practical demonstration Questions about the identification of the adhesive	Explanatory videos showing the difference between joints made with different adhesives. Beamer/ printed - presentation

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	- Polyurethanes - Anaerobics - Acrylics - Cyanoacrylates - Silicones - Polysulphides. - Polyimides-polyphenylquinoxalines-polybenzimidazoles - Inorganic adhesives - Butyls - Solvent acrylics - Water-base acrylics and polyvinyl acetates - Silicones Selection Requirements of Bonded Assembly • Use • Application • Materials to be joined (surfaces) • Type of joint • Process limitations • Mechanical requirements • Service conditions • Cost requirements Selection Criteria • Compatibility with the substrates • Process (number of components, physical form, pot-life, curing, viscosity/rheology, gap-filling) • Mechanical and thermal properties • Durability			

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