

## Course Description – Winter 2023/2024

<b>Title</b>	Fossil and bio fuels, lubricants and plastics
<b>Faculty</b>	Mechanical Engineering
<b>Professor</b>	Frau Claudia Beugel
<b>ECTS</b>	5
<b>Level</b>	Bachelor
<b>Requirements</b>	-
<b>Add. Information</b>	<a href="https://www.hs-schmalkalden.de/hochschule/fakultaeten/fakultaet-maschinenbau/internationales/englische-kurse.html">https://www.hs-schmalkalden.de/hochschule/fakultaeten/fakultaet-maschinenbau/internationales/englische-kurse.html</a>
<b>Content</b>	<p>Students review basics of organic chemistry to understand differences between conventional and bio-based fuels, lubricants and plastics. They should know characteristics of fuels and lubricants. Students should be able to analyze pros and cons of the usage of fossil and bio-based products and to evaluate conventional and alternative production methods.</p> <p>lab experiments: making and testing of biodiesel</p> <ol style="list-style-type: none"> <li>overview: structure and names of hydrocarbons (alkanes, alkenes, cyclic hydrocarbons, aromatic compounds, main functional groups)</li> <li>formation and composition of fossil materials (coal, crude oil, natural gas)</li> <li>processing of fossil raw materials into fuels, lubricants and plastics</li> <li>classification and properties of fuels and lubricants</li> <li>composition of biomass (plants oils, starch- and sugar-containing resources, wood, algae, vegetal and animal residues)</li> <li>structures, names and properties of natural products (saccharides, starch, cellulose, fats, oils, waxes, proteins)</li> <li>production and properties of alternative fuels and lubricants (biogas, bioethanol, plant oils, biodiesel, btl-biomass to liquid, syngas, bioplastics)</li> <li>bioreactors (types, functional principles and operating parameters)</li> </ol>