modul:	**Fossil and bio fuels, lubricants and plastics**
lecturer:	Dipl.-Chem. Claudia Beugel
Frequency:	annually in the winter semester
teaching language:	English
credits:	5 ECTS-credits
preconditions	for the written examination (120 min)
granting of credits:	lab certificate (attestation)
workload:	150 hours (present time 60 h + self-study 90 h)
teaching method:	lectures (2 h per week) lab experiments and exercises (2 h per week)
necessary knowledge:	fundamental chemical skills
supporting documents:	PowerPoint slides, lecture notes, lab instructions
course objectives:	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.
course contents:	lab experiments: making and testing of biodiesel 1. overview: structure and names of hydrocarbons (alkanes, alkenes, cyclic hydrocarbons, aromatic compounds, main functional groups) 2. formation and composition of fossil materials (coal, crude oil, natural gas) 3. processing of fossil raw materials into fuels, lubricants and plastics 4. classification and properties of fuels and lubricants 5. composition of biomass (plants oils, starch- and sugar-containing resources, wood, algaes, vegetal and animal residues) 6. structures, names and properties of natural products (saccharides, starch, cellulose, fats, oils, waxes, proteins) 7. production and properties of alternative fuels and lubricants (biogas, bioethanol, plant oils, biodiesel, btl-biomass to liquid, syngas, bioplastics) 8. bioreactors (types, functional principles and operating parameters)
reading:	Roussak, O./ Gesser, H.D.: Applied Chemistry – A Textbook for Engineers and Technologists, Springer-Verlag, 2013, ISBN 978-1-4614-4262-2 Schobert, H.: Chemistry of Fossil Fuels and Biofuels, Cambrigde University Press, 2013, ISBN 978-0521781268