

Modulbezeichnung	Energies and materials in biotechnology
Semester (Häufigkeit)	null (jedes Wintersemester)
ECTS-Punkte (Dauer)	6 (1 Semester)
Art	Compulsory elective module
Studentische Arbeitsbelastung	60 h Kontaktzeit + 120 h Selbststudium
Voraussetzungen (laut BPO)	N/A
Empf. Voraussetzungen	N/A
Verwendbarkeit	DEL
Prüfungsform und -dauer	Written exam 2 hour or oral exam at the choice of the examiner as well as group work with reports and presentations (academic assessment)
Lehr- und Lernmethoden	Lecture with practical exercises and/or project work
Modulverantwortliche(r)	R. Habermann
Qualifikationsziele After completing the module, students will be able to ... • describe biotechnological basics and basics of the biopharmaceutical industry • know different energies and materials in biotechnology with a focus on the biopharmaceutical industry • assess the advantages and disadvantages of disposable systems with a focus on energy and circular economy by ... • using, applying and bringing together the knowledge provided • drawing up balances to compare the different materials • deepening the knowledge based on current literature in group and project work in order to ... • gather basic knowledge for activities in the biopharmaceutical industry • be able to contribute concepts and ideas for the better use and reuse of resources in industry, research and development	
Lehrinhalte Basics of biotechnology, introduction to the biopharmaceutical industry, basics of bioprocess engineering, materials in biotechnology, disposable elements in the biopharmaceutical industry, advantages and disadvantages of disposable elements, energy balances of disposable systems compared to conventional stainless steel systems, cleaning and sanitization, regulatory requirements, personalized active ingredients	
Literatur Lecture manuscript and supplementary material Technical literature Gstraunthaler, G. Lindl, T.: Zell- und Gewebekultur; Springer, 2021 Eibl, R., Eibl D., Pörtner, R., Catapano, G., Czermak, P.: Cell and Tissue Reaction Engineering, Springer, 2009 Hass, V., Pörtner, R.: Praxis der Bioprozesstechnik mit virtuellem Praktikum, Spektrum, 2011 Chmiel, H.: Bioprozesstechnik, Springer Spektrum, Berlin, 2018 K. Muttzall, Einführung in die Fermentationstechnik, Behr's Verlag 1993	
Lehrveranstaltungen	

Dozenten/-innen	Titel der Lehrveranstaltung	SWS
I. de Vries	Energies and materials in biotechnology (lecture)	2
I. de Vries	Energies and materials in biotechnology (practical exercises and/or project work)	2