

Course Description: Waste Treatment and Resource Efficiency

Department	Industrial Engineering
Degree programme	<ul style="list-style-type: none"> • Environmental Technology & Development • Environmental Technology
Module name	Waste Treatment and Resource Efficiency
Module number	WI-B.420
Compulsory/ optional/ elective module	Compulsory module
Module coordinator	Prof. Dr.-Ing. Matthias Schirmer
Learning objectives	<p>The students will</p> <ul style="list-style-type: none"> • Get a deep knowledge of waste treatment and recycling • Get an understanding of the resource potential of waste and residues and the impact of circular economy for developed and emerging countries • Be able to compare and evaluate different waste treatment methods • Be able to apply methods of balancing energy and materials • Be able to calculate emission factors and carbon footprint of production processes and products • Get a knowledge of different technologies of increasing energy and material efficiency
Module content	<p>Part Waste Treatment</p> <ul style="list-style-type: none"> • Waste and recycling statistics • Waste legislation • Unit operations in recycling processes • Waste incineration and waste to energy • Waste disposal • Waste reduction • impact of circular economy in emerging countries <p>Part Resource Efficiency</p> <ul style="list-style-type: none"> • Material & energy balances • Emission factors, Carbon Footprint • Potential of energy efficiency (CHP, cooling, compressed air, heat pump, heat insulation) • Energy and material efficient production • Global material flows and transportation • Strategy „ressource efficient europe“
Course type (lecture, exercises, seminar, practical course)	0L - 1E - 4S - 0P
Recommended literature	<p>/1/ Billitewski, B.: Abfallwirtschaft – Handbuch für Praxis und Lehre, 4.Auflage, Berlin 2010</p> <p>/2/ Ploetz,C./ Reuscher, G./ Zweck, A.: Mehr Wissen – Weniger</p>

	<p>Ressourcen, Düsseldorf 2009</p> <p>/3/ Fresner, J.: Ressourceneffizienz in der Produktion: Kosten senken durch Cleaner Production</p> <p>/4/ Haas H.D./ Schlesinger D.M.: Umweltökonomie und Ressourcenmanagement, Darmstadt 2007</p> <p>/5/ Transferstelle Bingen (Hrsg): Rationelle und regenerative Energienutzung, Heidelberg 2006</p>
Learning materials	overhead transparency, blackboard, computing program
Method(s) of instruction/ media being used	excursions
Level/ category	Bachelor
Which semester (winter/ summer term)	Summer term
Which semester during the programme	4 th . semester; half of semester SW 8-15
Requirements for attendance	
Assessment (written/ oral test, paper, etc.)	alternative examination: tests
ECTS credits	6
Work load in:	75 h of contact hours 105 of self-study
Usability of this module	<ul style="list-style-type: none"> • Environmental Technology & Development • Environmental Technology
Frequency of offer	yearly
Duration of module	1 semester
Place/ room	EAH Jena
Time	According to schedule
Language(s)	English