

Innovation, Design and Quality for the Circular Economy (free/advanced elective)

Please see up-to-date information in the university's KUSSS system!

Criteria	Description
Semester	Summer / Winter
Course type	Lecture (VO)
Title	Innovation, Design and Quality for the Circular Economy
Workload	4 ECTS
Level	Master's, M1 or higher; Doctorate/PhD
Relevant programmes	Management Polymer Technologies (Advanced* or Free Elective); Free elective for all other relevant programmes in various faculties: SoWi (e.g. General Management, Global Business, Economics, Management and Applied Economics, Wirtschaftsinform and TNF (e.g. Wirtschaftsingenieurwesen - Technische Chemie, Mechatronisches Design, Polymer Chemistry, Polymer Technologies and Science, Nanoscience and -Technology)
	<i>* Recognition as Advanced Elective in the MPT programme is currently sought with the study programme's leadership</i>
Teacher	Prof. Dr. Erik Hansen
Hours/week	2
University	JKU
Source curricula/program	-
Goals	<p>The Circular Economy (CE) is a new vision covering the multiple levels of economies, organisations and individuals (as well as the societies they are embedded in) by addressing several of today's challenges such as resource scarceness (e.g. critical materials), environmental pollution and degradation (e.g. climate change, loss of biodiversity, unhealthy products) and the increasing dependency on ever increasing production quantities (and related resource useage) for safeguarding (national) employment levels. The CE proposes a value creation architecture based on material flows circulating either in biological cycles (e.g. biodegradable products) or technical cycles (e.g. reuse, refurbishing, repairing, recycling of products and materials) ultimately aiming at higher resource efficiency, decreased dependency on external inputs and significant increase of regional job opportunities in the service sector (e.g. repair, refurbishing). Furthermore, product sharing (e.g. carsharing) is considered an additional strategy for using existing resources more intensively.</p> <p>Against this background, this lecture will look at the implications of the CE for product and service development strategies (e.g. design-for-circularity, product take-back strategies), quality design and management (e.g. trade-offs such as lightweight-design vs. reparability; quality criteria for cycled materials and products) and firm's business models (e.g. transformation from product sales to product-service-systems approach).</p> <p>Each lecture covers an individual component of the CE and is based on scientific publications. This allows students to get an in-depth insight into the current scientific discourse. Additionally practitioner lectures and cases provide for the necessary bridging of theoretical knowledge into practice. As course exam, students are expected to develop a term paper in which they deep dive into one of the CE's issues and analyse related best-practices from industry.</p>

Contents	<p>PART I: FOUNDATIONS OF THE CIRCULAR ECONOMY</p> <ul style="list-style-type: none"> - Introduction - Basic environmental strategies: efficiency, consistency, sufficiency <p>PART II: LOOPS IN THE CIRCULAR ECONOMY</p> <ul style="list-style-type: none"> - Biological and technical cycles (cradle-to-cradle) - Technical cycles: Reuse, Refurbish, Remanufacture, Recycle (4R) - Product sharing as means of increased technology utilization <p>PART III: PRODUCT-SERVICE-SYSTEM DESIGN FOR THE CE</p> <ul style="list-style-type: none"> - Circular design I: Life-cycle approach - Circular design II: Design strategies using the Eco-design Strategy Wheel - Product-Service Systems and new business models - Quality and certification systems - Summary, Outlook, Evaluation results
Exam	Term paper based on application of CE principles to specific industries and companies
Teaching methods	Classical lecture, practitioner presentations, case studies
Language	English
Study Literature	<p>Selected publications:</p> <ul style="list-style-type: none"> - Ellen MacArthur Foundation (2013): Towards the Circular Economy 1. Economic and business rationale for an accelerated transition. - Braungart, Michael; McDonough, William A. (2009): Cradle to cradle. Remaking the way we make things. London: Vintage. - Stahel, Walter R. (2010): The performance economy. 2. Aufl. Basingstoke, England, New York: Palgrave Macmillan. - United Nations Environment Programme (UNEP); Delft University of Technology (TU Delft) (2009): Design for Sustainability. A Step-by-Step Approach. Paris, France.
Further information	<p>Start of the weekly lecture is usually in the 1st week of the term's lecture period. Please contact the designated Head of Institute, Prof. Dr. Erik Hansen (erik.hansen@jku.at) for further questions. Organizational issues can also be discussed in the first lecture.</p> <p>Institute's website: http://www.jku.at/iqd</p>
No. of participants (max)	-
Admission scheme	

Organizer Institute for Integrated Quality Design (IQD)

Online: www.jku.at/iqd

Date of information: 25.2.2016