

## P02 Energetic and technical use of agricultural crops

|                        |   |              |          |             |          |             |              |             |
|------------------------|---|--------------|----------|-------------|----------|-------------|--------------|-------------|
| <b>Module</b>          | <b>Energetic and technical use of agricultural crops</b>  |              |          |             |          |             |              |             |
| <b>Code</b>            | <b>P02</b>  |              |          |             |          |             |              |             |
| Coordinator            | Prof. Dr. M. Wachendorf   |              |          |             |          |             |              |             |
| Language               | English   |              |          |             |          |             |              |             |
| Stud. Workload         | 180h (60h contact time)   |              |          |             |          |             |              |             |
| Credits                | 6 ECTS  |              |          |             |          |             |              |             |
| Frequency (WS/SS)      | WS  |              |          |             |          |             |              |             |
| Part module 1          | Energetic use of agricultural crops   |              |          |             |          |             |              |             |
| Instructor 1           | Prof. Dr. M. Wachendorf   |              |          |             |          |             |              |             |
| Contents 1             | Management of agricultural crops for energetic use. Energy scenario and potentials, emission of greenhouse gases, sources of energy from biomass and waste material, selecting and processing biomass as a fuel. Biogas, fermentation process and plant technology. Vegetable oil, biodiesel. Processing of alcohol esters from triglycerides and free-fatty-acids. Ethanol fermentation process, distillation and dehydration, thermo-chemical processes. Gasification, Fischer-Tropsch-Process. |              |          |             |          |             |              |             |
| Objectives 1           | Based on the data presented, students are able to identify and calculate potentials and limits of energy production from renewable plant resources.   |              |          |             |          |             |              |             |
| Literature 1           | Klass, D. 1998: Biomass for Renewable Energy, Fuels, and Chemicals, Academic Press; Sims, R. 2002: The Brilliance of Bioenergy. James & James, London, UK; Rosillo-Calle, F. 2007: The Biomass Assessment Handbook. Earthscan; London, UK.  |              |          |             |          |             |              |             |
| Part module 2          | Technical use of agricultural crops   |              |          |             |          |             |              |             |
| Instructor 2           | PD Dr. M. Karpenstein-Machan  |              |          |             |          |             |              |             |
| Contents 2             | Management of agricultural crops for technical use. Technologies of processing biomasses to produce technical raw materials (fibres, colours, proteins, lipids, etc.). Benefits and restrictions by the replacement of fossil fuel-based materials through biomass-based products.  |              |          |             |          |             |              |             |
| Objectives 2           | Based on the data presented, students are able to identify and calculate potentials and limits of raw material production from renewable plant resources.   |              |          |             |          |             |              |             |
| Literature 2           | Will be provided via E-learning platform during the module  |              |          |             |          |             |              |             |
| Study system usability | Economy   |              | Organic  |             | Tropical |             |              |             |
|                        | E   |              | E        |             | E        |             |              |             |
| Entrance requirements  | Basic knowledge in soil and plant sciences, physics and chemistry   |              |          |             |          |             |              |             |
| Instruction type       | Lecture   |              | Seminar  | Excursion   | Practice | Tutorial    | Project      |             |
| Duration [contact h]   | 50  |              |          | 10          |          |             |              |             |
| Examination type       | Oral test   | Written test | Homework | Sem. speech | Protocol | Work report | Proj. report | Proj. pres. |
|                        | x   |              |          |             |          |             |              |             |
| Grade composition      | 100% oral test  |              |          |             |          |             |              |             |