

TUM Certificate Program

(English)

June – September 2024

Date/Week	Content
6 June 2024 (Thu) 18:00-19:00 CEST	Kick Off Session <i>online</i>
13 June 2024 (Thu) 18:00-20:00 CEST	Module 1 Raw Material Hop (Dipl.-Ing. Neugrodda) <i>online</i> Hop Varieties and Growing Regions Composition and Properties Hop Products
20 June 2024 (Thu) 18:00-20:00 CEST	Module 2 Raw Material Barley and Malt (Dr. Gastl) <i>online</i> Barley and Malt Quality Requirements Malting Technologies and Processes Malt Analysis Evaluation of Malt Quality Malt Types and other Specialty Malts
27 June 2024 (Thu) 18:00-20:00 CEST	Module 3 Brewing Water (Dr. Sacher) <i>online</i> Water Quality and Water Chemistry Requirements for Brewing Process Permanent Hardness and Residual Alkalinity Water Improvement and Quality Control Influence of Water Quality on Beer Styles
4 July 2024 (Thu) or 2 July 2024 for US 18:00-20:00 CEST	Module 4 Beer Styles, Alternative Raw Materials and Adjuncts (Dr. Martin Zarnkow) <i>online</i> Important Beer Styles Belgien, English, American Alternative Raw Material for Wort – other non-traditional Grains, Rice, Fruit, etc. Additives and Adjuncts
11 July 2024 (Thu) 18:00-20:00 CEST	Module 5 Brewing 1 - Wort Production (Milling, Mashing, Lautering) (M.Sc. Hör) <i>online</i> From Malt to Wort the Theory and Technology of Mashing Mashing Processes: Infusion/Decoction Milling, Mashing – In Lautering (Mash Vessels, Lauter Tun, Mash Filters) Brewhouse Technologies Quality, Economical Considerations
18 July 2024 (Thu) 18:00-20:00 CEST	Module 6 Brewing 2 - Wort Boiling and Cooling (M.Sc. Hör) <i>online</i> Chemical Processes during Wort Boiling, Addition of Hops Wort Boiling Systems – Comparison Principles of Wort Separation, Clarification, Hot Break Theory and Praxis of Wort Cooling Wort Aeration Small Batch Brewing
25 July 2024 (Thu) 18:00-20:00 CEST	Module 7 Workshop - Wort Production (M.Sc. Hör) <i>online</i>
1 August 2024 (Thu) 18:00-20:00 CEST	Module 8 Beer Production 1 - Fermentation and Maturation (Dr. Hutzler) <i>online</i> Yeast Taxonomy Characteristics and Metabolism Top and Bottom Fermenting Yeasts for Brewing Yeast Propagation and Management Alcoholic Fermentation Conventional Fermentation and Maturation Processes and Techniques Carbonization Storage and Aging

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8 August 2024 (Thu) 18:00-20:00 CEST	Module 9 Beer Production 2 - Filtration, Stabilization, and Filling (Dr. Schneiderbanger, Dipl.-Ing. Cotterchio) online Theory of Filtration, Stabilization and Filling Introduction into Technologies and Systems Filtration Types (Kieselgur / Membrane Filtration), Filtration Aids Stabilizing Agents Flavor Stability Filling Principles Analytics for Quality Control
15 August 2024 (Thu) 18:00-20:00 CEST	Module 10 "Design your first brews!" (M.Sc. Werner) online Brewing Math Brewing Calculations, Recipe Formulation What Parameters are Important for Planning a Brew Batch? Design and Calculate Your First Recipe – A Practical Guide Introduction to Beer Styles Troubleshooting
22 August 2024 (Thu) 18:00-20:00 CEST	Module 11 History of Brewing (Dr. Zarnkow) online
29 August 2024 (Thu) 18:00-20:00 CEST	Module 12 Analytics (Dr. Schneiderbanger) online Introduction to Water, Malt, Wort and Beer Analysis Measuring Technologies and Devices The Brewing Process – Correct Interpretation and Analysis of Key Measurements Quality Issues
3 September 2024 (Tue) 18:00-20:00 CEST	Module 13 Sensory Science (Dr. Lehnhardt, M.Sc. Kienitz) online The Human Sensory System Introduction into the Sensory Science Development and Sources of Flavors and Off-Flavors in Beer Overview of Selected Flavors and Off-Flavors: Importance, Problem Areas and Troubleshooting
5 September 2024 (Thu) 18:00-20:00 CEST	Module 14 Draft Beer Dispensing Systems (M.Sc. Werner) online Overview of Dispensing Systems Components Gas Systems and Types Risks and Safety Dispensing Unit Physics and Optimum Settings Cleaning and Maintenance Dispensing the Best Beer – Practical Tips
12 September 2024 (Thu) 18:00-20:00 CEST	Module 15 Cleaning and Sanitizing (M.Sc. Werner) online The World of Microorganism Microbiology in a Brewery Danger of Biofilms Principles of Cleaning, Sanitizing und Disinfection CIP Systems
16 – 20 September 2024 (Mon – Fri)	On-Campus Program - TUM Research Brewery, Weihenstephan Hands-On Brewing, Sensory Science, Beer Analytics Lab Excursions: Malting Plant, Hop Growing Region, Local Breweries Presentation of Certificates
Closing	Octoberfest 2024

For more information and registration <https://www.lll.tum.de/certificate/brauer-kursus/>