COFFEE SKILLS PROGRAM

Brewing

Foundation | Intermediate | Professional

Specialty Coffee Association

BREWING

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BREWING CURRICULUM: Professional	
Title of module	Brewing
Level	Professional
Recommended course hours	18 hours excluding exams
Course aim	The course tests the ability of the professional brewer to navigate the Brewing Control Chart. This course is intended to extend the practical and sensory brewing capabilities of the professional brewer.
Information for trainer	The Professional Brewing Module relies on the AST sourcing a coffee that will demonstrate the learning objective of all practical exercises. Not all specialty coffee roast profiles make achieving targets easy, especially the 24% target in 2.0 Extraction exercises and the Practical Exam. It is the responsibility of the AST to source a calibration coffee capable of achieving the targets required; not adjusting the targets to suit the coffee! We recognize that regionally, nationally and internationally there will be many coffees available that will achieve the desired results, thus there is no need to dictate exact parameters for the coffee to be used. The AST can choose to work with any specialty coffee, single origin or blended, they deem suitable. The parameters for many exercises are deliberately vague, as in: slow, medium, fast or none, some and excessive. The Professional Brewer should be flexible and responsive to local conditions, cultural preferences and coffees. Vague parameters also promote creativity, experimentation, and discussion based on results in the brewed coffee, which is at the heart of Professional Brewing. We recommend using an automatic filter brewer for the Extraction & Strength exercises with minimum brews of 1 liter rather than using single cup manual brewing methods. The control of brewing parameters/variables of these brew sizes will facilitate predictable results. We do not, however, encourage excessive coffee waste. ASTs are not limited to AFB equipment, and the use of various Immersion, Gravity and Pressure brewing equipment will generate healthy discussions. Students must have a certification in Brewing Intermediate; Barista Intermediate is recommended. Students must use brewing worksheets for every brew produced during course.

Code/subject	Sub code	Knowledge/skills (*what does the student need to know/what should the student be able to do)*	Objective (*what does the student need to do to demonstrate knowledge or skill)*	AST Notes / References
1.0 EXPLORING CORE BREWING VARIABLES	1.1	**Essential Elements of Brewing** List the 7 essential elements of the brewing process	Briefly review the 7 essential elements of the brewing process. This review will prepare the group for the in-depth exploration, discussion and myth busting of aspects of these variables.	The Coffee Brewing Handbook – SCAA Everything but Espresso, Rao The Craft and Science of Coffee, Folmer, et. al
	1.2	**Temperature** Recognize the relationship between temperature variation and differences in the finished brew.	Taste and chart all coffees. Compare & discuss the difference in taste.	
	1.3	**Wetting (blooming)** Identify methods of varying wetting phase approaches. Recognize the relationship between wetting phase difference and differences in the finished brew.	Sensory & technical evaluation of three brews with variable wetting(blooming) parameters (none, some, excessive) using reference brew parameters. Common practice being 2g water per gram of coffee with 30sec even wetting	**AST note:** Measure and chart, use same brew method for each coffee, ie, Immersion / Gravity / AFB / Pressure

	1.4	**Agitation (turbulence)** Identify methods of varying turbulence time, frequency, and force. Recognize the relationship between turbulence variation and differences in the finished brew.	Sensory & technical evaluation of three brews with varying levels of agitation (none, some, excessive) using the calibration brew parameters	**AST note:** Measure and chart, use same brew method for each coffee, ie, Immersion or Steep & Release recommended
	1.5	**Contact Time** Identify methods of varying water contact time for a brew method. Recognize the relationship between contact time variation and differences in the finished brew	Sensory & technical evaluation of three brews with different contact times using the reference brew parameters	**AST note:** Measure and chart, use same brew method for each coffee, ie, suggested brew method is immersion, steep & release or automatic filter brew.
	1.6	**Filtering Materials** Identify different filter media options. Recognize the relationship between various filtering media and differences in the finished brew.	Sensory & technical evaluation of paper, metal or cloth filters using one brewing method	**AST note:** Use one brew method that has two filtering material options using standard reference/ calibration brew recipe.
	1.7	**Filter Shape** Identify different filter media shapes. Recognize the relationship between various filter shapes (cone, truncated cone, flat bottom) and differences in the finished brew.	Sensory evaluation of different brews made using the same recipe and brewing parameters using 3 different shapes: flat bottom, cone, and truncated cone.	Relationship of Coffee bed depth to Volume of Filter by EE Lockhart The Coffee Brewing Handbook – SCAA Everything but Espresso, Rao, Chapter 5

2.0 EXTRACTION	2.1	Using the Professional Brewing Worksheet, formulate and carry out a brew plan for increasing/ decreasing extraction while maintaining consistent strength.	Brew and chart 16%, 20%, and 24% extraction at the same strength i.e. 1.3%. The acceptable margin of error on each extraction is 1% and .05% strength Taste and understand the difference in the cup.	
3.0 STRENGTH	3.1	Explain coffee to water ratios and possible impacts on other elements. Using the Professional Brewing Worksheet, Construct and carry out a brew plan for increasing/ decreasing strength while maintaining consistent extraction %.	Brew and chart 20% extraction. -target brew strengths are 1.15% / 1.35% / 1.45% - using the following brew ratios to create your brews: 50g/l, 60g/l(reference/ calibration brew), 70g/l	
4.0 GRIND SIZE	4.1	**Grind Particle Size** Recognize contributions that different sized particles make to the finished brew.	Sensory & technical evaluation of different particle sizes and the impact in the cup. -below 400microns -between 400 and 800 microns -above 800 microns -combination (reference/ calibration brew)	**AST note:** Use 800 and 400 micron sieves to achieve separation of the reference/ calibration brew grind; if you have access to more sieves of various sizes, you can taste more brews from the various micron sizes. This can be done before the course with samples stored in an airtight container

	4.2	Recognize effect of grinder burr edge quality on particle quality and distribution, using new (unseasoned), optimum condition, and heavily-worn burrs.	Evaluate two coffee samples ground using new or "seasoned", and heavily worn burrs	**AST note:** Use a worn burr set (flat or conical) and either a new (unseasoned) OR seasoned burr set (flat or conical). Ideally these burrs come from the same grinder but this may not always be possible. The objective here is understanding how burr wear affects extraction. Discuss effect of unseasoned burrs on brewing process and ways to compensate. Samples can be prepared before the course stored in an airtight container. It is not expected that ASTs will change burrs mid course.
5.0 THE EFFECTS OF ROAST	5.1	**Roast Level vs Cup** Generalize the relationship between roast level and extraction.	The same coffee at three roast levels/profiles, brew all the same way (reference/ calibration brew) and chart to see how the roast level impacts the extraction.	**AST Note:** Select roast levels which demonstrate a clear difference in results. For example: coffee roasted to within 1st crack, between 1st and 2nd crack, and 30+ seconds into second crack. Immersion or Steep and Release brew method is recommended to keep contact time consistent.

6.0 USING BY-PASS	6.1	Recognize sensory and measured differences between brews made with and without bypass. Construct bypass brew manually, measure brew before and after adding bypass water	Taste and record observations, measure, and chart brew before and after diluting with bypass water	**AST Note:** Brew coffee using same method and coffee amount as reference brew but with 25% less water and 25% less contact time. Taste and Measure TDS, then use appropriate recipe line on brewing control chart to calculate extraction %. Add bypass water (25% of water volume), taste and measure TDS to determine strength. Compare to reference brew.
	6.2	How to chart Measure bypass sample created in 2.1 and use Calculation method to determine extraction % and strength.		Guidelines for Using By-Pass from the SCAA
	6.3	**When and why to use it** Discuss reasons to use bypass	Explain what by-pass can do to your finished brew and when it is used. Sometimes used to speed up the brew process when producing large volumes. Sometimes used to reduce extraction a small amount to lose bitter edge	

7.0 KNOW YOUR WATER	7.1	**The Three Key Qualities of Water** Identify the three central measures to characterize water for coffee brewing. Discuss Measure, Aim, Treat strategy	Alkalinity, Total Hardness (TH), pH	SCAE Water Chart, Page 0-1. The Craft and Science of Coffee, Folmer, et. al
	7.2	**Alkalinity Measure:** Practice measurement of Alkalinity and plotting on the Water Chart. Aim: Discuss Alkalinity's effects on the cup, and recommended levels.	Alkalinity Measure: Practice measurement of Alkalinity and plotting on the Water Chart. Aim: Discuss Alkalinity's effects on the cup, and recommended levels.	SCAE Water Chart pg 6 & 7 for background. SCAA Water Quality Handbook pg 9
	7.3	**Total Hardness (TH)** Discuss components of Total Hardness. Measure: Practice measurement of Total Hardness and plotting on the Water Chart. Aim: discuss Total Hardness's effects on the cup and equipment plus recommended levels.	Learn & practice to measure TH using 'drops kit'	SCAE Water Chart pg 6 & 7 for background

	7.4	**pH** **Measure:** Practice measurement of pH Aim: Discuss effect of pH on the cup and equipment plus recommended levels.	Learn & practice to measure pH using digital meter and strips	http://en.wikipedia.org/wiki/Hard_water
	7.5	**Treatment strategies** Discuss treatment strategies for addressing elements which are outside recommended levels.	Learn to predict how extremes and or uncontrolled parameters impact coffee quality.	-Water for Coffee -SCAE Water chart
	7.6	**Total Dissolved Solids (TDS)** Measure: Discuss TDS, potential limitations of TDS measurement		SCAE Water Chart pg 8 for limitations.
	7.7	**Water Testing**	Students to test samples provided by AST to determine viability of sample for brewing as per SCAE Water Chart and to discuss possible source of samples	**AST Note:** Compare measured results for tap water to the local Water Report, if available. Discuss any differences between report and measured results.

	7.8	**Brewing Using Variable Waters**	Brew & taste using three different waters: RO, no minerals added <20ppm total TDS, SCAE/SCAA water standard, High TDS Bottled Water	**AST Note:** Provide at least 3 measurably different water samples. Bottled waters available from local retailers should represent a sufficiently-wide range of mineral content. See SCAE Water Chart page 10 for some bottled water compositions.

REFERENCES:

The Coffee Brewer's Handbook	Ted R. Lingle
SCAE Water Chart Report	Marco Wellinger, Samo Smrke and Chahan Yeretzian
The Craft & Science of Coffee	Britta Folmer
The Water Quality Handbook	David Beeman, Paul Songer, and Ted R. Lingle
Water for Coffee: Science Story Manual	Maxwell Colonna-Dashwood and Christopher Hendon
SCAE Gold Cup Grinding Research Report	Francisca Listov-Saabye
SCAE Gold Cup European Extraction Preferences	