Cicerone® Certification Program
US Certified Beer Server Syllabus

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This syllabus outlines the knowledge required of those preparing for the Certified Beer Server exam in the United States (for syllabi pertaining to other regions, visit cicerone.org). While this list is comprehensive in its scope of content, further study beyond the syllabus is necessary to fully understand each topic. The content tested on the Certified Beer Server exam is a subset of the information presented within the Master Cicerone® syllabus, and individual syllabi for all four levels of the program may be found on the cicerone.org website.

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Full Syllabus

I. Keeping and Serving Beer

A. Purchasing and accepting beer
   1. The three-tier system in the United States and the reasons for its existence
      a. By law, alcoholic beverages sold in the United States must move through the three-tier system. The three tiers are brewers/importers, wholesalers (also known as distributors), and retailers
         i. Brewers and importers sell to wholesalers
         ii. Wholesalers sell to both on- and off-premises retailers
         iii. On- and off-premises retailers sell to consumers
      b. Some states have granted exceptions to the three-tier system. Common exceptions include:
         i. Brewpubs that both brew and retail to consumers
         ii. Breweries that brew and sell directly to retailers or consumers

B. Serving alcohol
   1. Alcohol's effects
      a. Absorption and elimination
      b. Physical and behavioral indicators
   2. Responsible serving practices
      a. Provide accurate ABV information to consumers
      b. Adjust serving size based on ABV

C. Beer storage
   1. Beer is best consumed fresh
      a. When beer is released from the brewery, it is ready to drink
      b. Certain types of beers may age in ways that make them interesting to drink months or years later if properly cellared, but the majority of beer should be consumed fresh
   2. Rotate inventory
      a. Check date codes regularly
         i. Meaning of code
            - Some date codes indicate the best-by date
            - Some date codes indicate the bottling/packaging date
         ii. Types of codes (order and number of digits may vary)
            - Traditional consumer date codes (e.g., 061512 = June 15, 2012)
            - Julian/ordinal date codes (364-14 = December 30, 2014)
            - Some breweries have their own proprietary date code format
      b. Ensure that beer is consumed in the order of dating
      c. Remove out of date products from service inventory
      d. General freshness guidelines
         i. Draft beer
            - Non-pasteurized draft beer can remain fresh for about 45–60 days (refrigerated)
            - Pasteurized draft beer can remain fresh for about 90–120 days (refrigerated)

- When not refrigerated or subjected to other stresses, shelf life decreases significantly

ii. Bottled/canned beer
- If kept refrigerated, can remain fresh for up to 6 months
  - Hoppy styles like IPA are more susceptible to the effects of time, and may show flavor changes in as little as 3 months, even when refrigerated
- When not refrigerated or if subjected to other stresses, may be noticeably off after 3 months
- Taste aged product against fresh product to determine deterioration

e. Train staff to promote and sell all beers offered

3. Store beer properly
   a. Refrigerated storage is best for all beers at all times
      i. If beer is not refrigerated, keep inventories small and sell the beer quickly
   b. Non-refrigerated storage accelerates aging and development of off flavors
      i. With time, all beers will develop signs of oxidation (diminished hop flavor and aroma; malt shift towards honey, caramel, toffee, etc.; papery and wet cardboard flavors)
   c. Temperature changes within a reasonable range (e.g., moving beer from cold storage (38 °F/3 °C) to room temperature storage (68–77 °F/20–25 °C) or vice versa) are not inherently damaging to a beer's flavor, though the beer will remain fresh for longer if stored at cold temperatures at all times
   d. Beer should not be allowed to reach temperatures in excess of 77 °F (25 °C) as these conditions lead to rapid flavor degradation
4. Protect beer from light
   a. Skunky flavor (also known as lightstruck flavor) is caused by sunlight, fluorescent light, and most LED lights and is most noticeable in the aroma of the beer
   b. Skunking may be evident after just a couple minutes of light exposure
   c. Bottled beers are subject to skunking
      i. Brown glass blocks most of the wavelengths of light that cause skunking, and therefore offers superior protection to clear and green glass
      ii. Green glass blocks very little of the light that causes skunking
      iii. Clear glass offers no protection against skunking
   d. Cans, ceramic bottles, and bottles in closed case boxes that completely shield beer from light give maximum protection from skunking
5. Serve beer properly
   a. Draft beer must be served using CO_2 or a CO_2-nitrogen mix at the proper pressure setting
   b. Compressed air should never be used to pressurize traditional kegs in which the dispense gas comes into contact with the beer
   c. A party pump (a manually operated pump that attaches to the top of a keg to allow for temporary dispense of beer by pushing air into the keg) limits the flavor stability of the beer to **less than one day** because oxygen is put in contact with the beer

D. Draft systems
   1. Key elements

a. Keg
b. Coupler
c. Foam on Beer detector (FOB)
d. Faucet

2. Draft system operation
   a. Standard cooler and system temperature of 38 °F (3 °C)
   b. All kegs should be in the cooler for at least 24 hours prior to service to prevent foaming
   c. Gas pressure applied to keg should only be set or adjusted by a draft-trained professional
3. Basic troubleshooting
   a. Beer has been in the cooler for at least 24 hours prior to service
   b. Coupler is properly engaged
   c. No kinks or pinches in hose from coupler to wall
   d. FOB, if present, is properly set for service
   e. If beer is still pouring badly, contact a draft-trained professional for assistance
4. Draft system maintenance
   a. Draft systems need to be cleaned to prevent development of off flavors in beer and to ensure proper operation of the draft system
   b. Draft line cleaning is required every 14 days
   c. Due to the hazardous nature of cleaning solutions, never attempt to pour beer prior to full completion of draft system cleaning
5. Temporary draft systems – jockey boxes
   a. Portable draft dispense units consisting of a picnic cooler with a cold plate or cooling coil to chill the beer and a faucet at the point of dispense
   b. Commonly used for one-day events or festivals where normal keg temperature cannot be maintained due to lack of refrigeration
   c. Two common varieties
      i. Cold plate
         - Used for lower-volume dispensing
      ii. Coil-style
         - Used for higher-volume dispensing
      iii. Cold plate jockey box setup
         - Tap the keg and run beer through the faucet before adding ice to the system.
         - Add ice both underneath and on top of the cold plate inside the cooler
         - Adjust the pressure to attain the desired flow rate
      iv. Coil-style jockey box setup
         - Tap the keg and run beer through the faucet before adding ice to the cooler
         - Add ice to the cooler making sure to cover the entire coil
         - Create an ice bath by adding cold water to the top of the coil
         - Adjust the pressure to attain the desired flow rate
      v. Cleaning and maintenance
         - It is important to clean jockey boxes after every use in order to prevent the growth of bacteria or mold

E. Beer glassware

1. Select appropriate glassware
   a. Size
      i. Higher alcohol beers should be served in smaller glasses
      ii. Glass should provide room for an appropriately sized head
   b. Shape
      i. Cultural and historical traditions connect certain glasses to specific styles
   c. Brand
      i. Branded glasses matched to beer
2. Use "beer clean" glassware
   a. Each glass must be cleaned before refilling. Do not refill a used glass
   b. Glass cleaning procedure – three-sink method
      i. Prepare the three sinks for glassware cleaning
         - The first sink should be filled with warm water and a non-petroleum based (sudsless) detergent
         - The second sink should contain cool, clean rinse water that is being continually refreshed through use of an overflow tube
         - The third sink should contain hot water and an appropriate sanitizer at the correct concentration as specified by the manufacturer
      ii. Empty the glass into an open drain
      iii. Wash glass in the first sink with soap and a brush
      iv. Rinse glass in cold water in the second sink, heel in, heel out
      v. Rinse glass in sanitizer in the third sink, heel in, heel out
      vi. Dry glass inverted on a rack so air circulates inside
   c. Glass cleaning procedure – glass washing machine
      i. Empty the glass into an open drain
      ii. Place glass upside down on the rack of the washer
      iii. Run the wash cycle according to the manufacturer's instructions
      iv. After washing, dry glass inverted on a rack so air circulates inside
      v. Glass washing machine considerations
         - Use a machine dedicated to beer glassware ONLY. Do not use this machine to clean dishes or glassware with food or dairy residue (e.g., coffee mugs with cream or milk added, cocktails incorporating egg whites or cream, etc.)
           - Fats from food or dairy will coat other glassware in the washer resulting in dirty glasses and poor head retention
         - Use correct detergent and sanitizer—check concentrations daily or follow detergent and sanitizer supplier recommendations
         - Water temperature should range between 130 and 140 °F (54–60 °C). High-temperature machines designed to operate at 180 °F (82 °C) may be used in place of chemical sanitizers (though local health departments may have additional requirements)
         - Maintain washer to assure proper water flow through each nozzle and washer arm
         - Regularly service machine following manufacturer's guidelines to ensure proper operation

- Periodically check the interior of the glass washer to be sure that it is free of mold and debris

d. How to check that glass is beer clean
   i. Without beer
      - Sheeting (wet glass interior and then empty glass; water should sheet off of glass evenly; formation of droplets or webbing indicates that the glass is not beer clean)
      - Salt test (wet glass interior, empty glass and then sprinkle salt throughout; places where salt does **not** adhere are not beer clean)
   ii. With beer
      - Head size, shape, retention—good head formation and retention are signs of a beer clean glass
      - Bubbles clinging to the sides of the glass (in liquid beer) indicate that the glass is **not** beer clean
      - During consumption, lace will cling to the side of a beer clean glass following each sip

3. Preparation to serve
   a. Glass temperature
      i. Glasses should not be warm to the touch when filled
      ii. Room temperature and chilled glasses are acceptable
      iii. Frozen/frosted glasses are not recommended—they cause foaming, they make beer too cold, and frozen water or sanitizer may be present
   b. Cold water rinse of glass before filling
      i. Removes residual sanitizer
      ii. Cools glasses that may be warm from washing
      iii. Aids ideal head formation and retention
      iv. Do NOT rinse used glasses with a glass rinser—glass rinsers should only be used with clean glassware

F. Serving bottled beer
   1. Prepare for service
      a. Bottle-conditioned beer should be stored upright prior to service
         i. Bottle-conditioned beer is carbonated by yeast in the package, and consequently contains some amount of sediment
      b. If possible, store beer at ideal serving temperature as dictated by style. Otherwise store all beer refrigerated (43 °F/6 °C or less)
   2. Examine bottle
      a. Look for white flakes (snow-like) which can indicate old, unstable beer. Do not serve beer in this condition
      b. Look for a thin ring of residue at liquid level in the neck of the bottle, which is generally indicative of a bad bottle if present. Do not serve beer in this condition
      c. Check for yeast on the bottom of the bottle
         i. Retain yeast in bottle unless:
            - Consumer requests yeast to be poured
            - Style (e.g., Weissbier) is often poured with yeast
         ii. To pour yeast, rouse by swirling, rolling, or inverting
   3. Open bottle

a. Twist-off crown
   i. Twist off by hand
   ii. Napkin may be used to aid grip and protect hand
b. Pry-off crown
   i. Prefer openers with a bar or other lift area at least 0.25 in (0.5 cm) wide to prevent the possibility of breaking the bottle during opening
   ii. Lift in one motion
c. Mushroom cork
   i. Practice cork safety—keep bottle pointed away from consumer at all times
   ii. Remove wire cage by untwisting the tab
   iii. Hold thumb over cork at all times once cage has been removed
   iv. Grip the cork in one hand (a napkin may be used to aid your grip) and the bottle in the other. Remove cork by twisting the bottle to loosen the cork
   v. When removing the cork, do so slowly and gently so as not to disturb sediment and make the beer volatile
d. Crown plus cork
   i. Practice cork safety—keep bottle pointed away from consumer at all times
   ii. Lift crown as described in I.F.3.b
   iii. Corkscrew will be required after removing crown
   iv. Place the tip of the corkscrew on the center of the cork and turn clockwise to drive the corkscrew into the cork
   v. When removing the cork, do so slowly and gently so as not to disturb sediment and make the beer volatile
e. Wax-dipped crown
   i. Use a paring knife or the blade of a wine key to cut out a small notch of wax directly below the crown to allow a bar key to reach under the crown
   ii. Use a bar key to pry the crown off of the bottle, being careful to ensure that no flakes of wax fall into the bottle
   iii. Use a clean bar towel to wipe any wax debris from the lip of the bottle

4. Final bottle check
   a. Check bottle lip—do not serve beer from bottles with broken or damaged lips
   b. Also examine bottle lip for rust, dried beer, or yeast that could affect flavor or appearance of the beer
   c. If the bottle has a cork, retain and present it to the consumer
      i. In the case of a rare, unusual, or new beer, the crown should be retained to present to the consumer
5. Pouring bottled beer
   a. Filtered beer
      i. Beers bottled without yeast or other sediment—the entire contents of the bottle can be poured into the glass
      ii. Hold the glass at a 45-degree angle and pour down the side of the glass until the glass is 2/3 full
      iii. Gently tilt the glass upright and pour down the middle to create approximately 1 inch (2.5 cm) of foam head on the beer as the pour finishes. German wheat beers and Belgian ales traditionally should have 2–3 in (5–8 cm) of head
   b. Unfiltered beers

i. Some beers are packaged unfiltered or with yeast in the bottle. In most cases, yeast and sediment should be retained in the bottle
ii. Throughout the pour, be careful not to disturb the sediment
iii. Hold the glass at a 45-degree angle and pour down the side of the glass until the glass is 2/3 full
iv. Gently tilt the glass upright and pour down the middle to create an appropriate amount of foam for the style being served
v. While finishing the pour, watch the neck of the bottle and be prepared to stop pouring when the yeast moves toward the top of the bottle
vi. When in doubt about whether to include the yeast, ask the consumer their preference

G. Serving draft beer
1. Pouring a beer
a. **Never** put the faucet in contact with the glass
b. **Do not** allow the faucet to become immersed in the beer or foam in the glass
c. Hold the glass at a 45-degree angle, 1 inch (2.5 cm) below the tap faucet
d. Grip the faucet handle near the base and pull forward to the fully open position to start the flow of beer
i. When a faucet is only open partially, beer will pour foamy
e. Pour down the side of the glass until the glass is 2/3 full
f. While continuing to pour, gently tilt the glass upright and pour down the middle to create an appropriate amount of head on the beer as the pour finishes. German wheat beers and Belgian ales traditionally should have 2–3 in (5–8 cm) of head
g. Close the faucet as the foam cap reaches the top of the glass to prevent beer waste
2. Pouring nitro beer
a. **Never** put the faucet in contact with the glass or allow it to become immersed in the beer or foam in the glass
b. Hold the glass at a 45-degree angle, 1 inch (2.5 cm) below the faucet
c. Pull the tap handle forward to the fully open position to start the flow of beer
d. Pour down the side of the glass until the glass is three-quarters full
e. Allow the beer to settle for 1–2 minutes, and then pour down the middle to create an appropriate amount of head on the beer as the pour finishes
3. Changing a keg (same product)
a. Kegs must be chilled to draft system operating temperature (generally 38 °F/3 °C) before tapping and serving—the general guideline is to place kegs in the cooler at least 24 hours before serving
b. For many coupler designs[1]:
i. Grip keg coupler handle, then pull out (some coupler models instead require a button on the underside to be depressed) and raise the handle to the "up" or "off" position to disengage. Turn the coupler a quarter turn (90 degrees) counterclockwise to unseat. Lift off of the keg
ii. Seat the coupler on a new keg. Turn clockwise a quarter turn (90 degrees) to lock the coupler in place, then lower the coupler handle to the "down" or "on" position to engage

[1] The procedure described is used to change kegs with D-, G-, S-, and U-system couplers. Certified Beer Server candidates do not need detailed knowledge of each coupler system but must understand the basic steps to change a keg.

c. In systems that use them, the foam on beer detector (FOB) for the keg needs to be reset after a keg change. This is done by venting the FOB mechanism to release foam and gas from the chamber and filling with beer.

II. Beer Styles

A. Understanding beer styles
   1. Historical development of beer styles
      a. First driven by available ingredients, equipment, and water
      b. Shaped by technology, taxes and regulations, culture, consumer appeal, etc.

B. Style parameters
   1. Quantitative parameters of beer character
      a. Alcohol content
         i. By volume (ABV)
         ii. By weight (ABW)
      b. International Bitterness Units (IBUs)
      c. SRM Color
   2. Qualitative parameters of beer character
      a. Appearance
      b. Aroma
      c. Flavor
      d. Finish/Aftertaste
      e. Mouthfeel
      f. Perceived bitterness

C. Beer style knowledge
   1. Knowledge requirements of the styles listed in this section
      a. Qualitative knowledge of perceived bitterness using the following descriptors: low, moderate, pronounced, assertive, or highly assertive[2]
      b. Qualitative knowledge of color using the following descriptors: straw, gold, amber, brown, or black
      c. Qualitative knowledge of alcohol content using the following descriptors[3]: lower, normal, elevated, high, or very high[4]
      d. Qualitative knowledge of key flavors
   2. Beer styles by region[5]
      a. Belgium and France
         i. Lambic beers
            - Gueuze (PB – Low; C – Light gold to gold; ABV – Normal to elevated)
            - Fruit Lambic (Kriek, Framboise, etc.) (PB – Low; C – Varies with fruit; ABV – Normal to elevated)
         ii. Flanders ales

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[2] Test questions will reference IBUs as cataloged by the 2021 BJCP guidelines in addition to perceived bitterness levels as presented in the Certified Beer Server Syllabus

[3] Alcohol level descriptors correspond to the following ABV ranges: Lower – <4.5%; Normal – 4.5–6.0%; Elevated – 6.1–7.5%; High – 7.6–10.0%; Very high – >10.0%

[4] Test questions will reference ABV values as cataloged by the 2021 BJCP guidelines in addition to alcohol level descriptors as presented in the Certified Beer Server Syllabus

[5] Key for style descriptors: PB – Perceived Bitterness; C – Color; ABV – Alcohol level

- Flanders Red Ale (PB – Low; C – Red-brown; ABV – Normal to elevated)

iii. Trappist and abbey ales
- Belgian Dubbel (PB – Low; C – Light amber to dark amber; ABV – Elevated)
- Belgian Tripel (PB – Moderate; C – Light gold to gold; ABV – High)

iv. Pale Belgian beers
- Belgian Blond Ale (PB – Low; C – Light gold to gold; ABV – Elevated)
- Belgian Golden Strong Ale (PB – Moderate; C – Straw to gold; ABV – High to very high)

v. Unique beers
- Saison[6] (PB – Moderate; C – Light gold to amber; ABV – Normal to elevated)
- Witbier (PB – Low; C – Straw to light gold, made white by haze; ABV – Normal)

b. Britain and Ireland

i. England
- Pale ales
  - Best Bitter (PB – Pronounced; C – Gold to amber; ABV – Lower to normal)
- Dark ales
  - British Brown Ale (PB – Moderate; C – Amber to brown; ABV – Lower to normal)
  - Sweet Stout (PB – Low to moderate; C – Dark brown to black; ABV – Lower to normal)
  - Oatmeal Stout (PB – Moderate; C – Brown to black; ABV – Lower to normal)

ii. Scotland
- Wee Heavy (PB – Low; C – Amber to brown; ABV – Elevated to high)

iii. Ireland
- Irish Stout (PB – Pronounced; C – Brown to black; ABV – Lower to normal)

c. Germany, Czech Republic, and Austria

i. Lagers
- Pale
  - German Pils (PB – Pronounced; C – Straw to light gold; ABV – Normal)
  - Munich Helles (PB – Moderate; C – Straw to light gold; ABV – Normal)
  - Czech Premium Pale Lager (PB – Pronounced; C – Straw to Gold; ABV – Lower to normal)
- Amber or dark
  - Märzen (PB – Low; C – Gold to dark amber; ABV – Normal to elevated)
- Bocks

[6] Variations in strength (table, standard, super) and color (pale, dark) exist – candidates are tested on the standard-strength, pale variety

- Helles Bock (PB – Moderate; C – Gold to light amber; ABV – Elevated)
- Doppelbock (PB – Low; C – Gold to brown; ABV – Elevated to high)

ii. Ales
- Wheat beers
  - Weissbier (PB – Low; C – Straw to gold; ABV – Normal)
  - Berliner Weisse (PB – Low; C – Straw; ABV – Lower)
  - Gose (PB – Low; C – Straw to light gold; ABV – Lower to normal)
- Rhine Valley ales
  - Kölsch (PB – Moderate; C – Straw to light gold; ABV – Normal)

d. United States

i. Pale lagers
- American Light Lager (PB – Low; C – Straw; ABV – Lower)

ii. Amber lagers
- California Common (PB – Pronounced; C – Light amber to amber; ABV – Normal)

iii. Pale ales
- American Wheat Beer (PB – Moderate; C – Straw to gold; ABV – Lower to normal)
- American Blonde Ale (PB – Moderate; C – Straw to gold; ABV – Lower to normal)
- American Pale Ale (PB – Pronounced; C – Light gold to light amber; ABV – Normal)
- American Amber Ale (PB – Pronounced; C – Light amber to dark amber; ABV – Normal)

iv. IPAs
- American IPA (PB – Assertive; C – Gold to amber; ABV – Normal to elevated)
- Double IPA (PB – Highly assertive; C – Gold to amber; ABV – High)
- Hazy IPA (PB – Pronounced; C – Straw to gold, often with significant haze; ABV – Elevated to high)

v. Dark ales
- American Brown Ale (PB – Moderate; C – Dark amber to black; ABV – Normal)
- American Porter (PB – Pronounced; C – Brown to black; ABV – Normal to elevated)
- American Stout (PB – Assertive; C – Dark brown to black; ABV – Normal to elevated)
- Imperial Stout (PB – Pronounced; C – Dark brown to black; ABV – High to very high)

vi. Strong ales
- American Barleywine (PB – Pronounced; C – Light amber to light brown; ABV – High to very high)

e. Other regions

i. International

- International Pale Lager (PB – Moderate; C – Straw to gold; ABV – Normal)

f. Emerging Styles
   i. Pastry Stout or Dessert Stout
      - A dark beer that uses culinary ingredients like marshmallow, vanilla, chocolate, coffee, fruits, nuts, or spices to create a flavor profile that mimics desserts, pastries, or candies
      - (PB – Low to moderate; C – Dark brown to black; ABV – Elevated to very high)
   ii. American-Style Fruited Sour
      - A sour beer produced with fruit, fruit extracts, or flavorings that provide harmonious fruit flavor ranging from subtle to intense.
        - Should be free of wood-aged flavors, as well as funky, wild flavors from other yeast and bacteria
        - (PB – Low; C – Varies with fruit; ABV – Varies)

g. Non-alcoholic (NA Beer) and Alcohol-free beer
   i. Any style can be made NA or Alcohol-free
      - There are several methods used to produce NA or Alcohol-free beer
   ii. NA Beer
      - TTB regulations state that a beer must be below 0.5% ABV to be considered Non-Alcoholic
   iii. Alcohol-free beer
      - TTB regulations state that a beer must be 0.0% ABV to be considered Alcohol-free

h. Gluten-free beer
   i. Gluten is a protein commonly found in cereal grains including barley and wheat
   ii. Commonly used gluten-free grains
      - Sorghum
      - Millet
      - Rice
      - Corn
      - Buckwheat
      - Quinoa
   iii. Any style can be made gluten-free or gluten-reduced
   iv. Gluten-free vs Gluten-reduced
      - Gluten-free beers are made entirely with gluten-free grains
      - Gluten-reduced
        - Gluten-reduced beers can be made with grains that contain gluten or with a combination of gluten-free and gluten-containing grains
          a. The beer is then processed to break down or reduce the amount of gluten present
          b. Local regulations dictate the allowable level of gluten
          c. In the US, it must contain less than 20 ppm of gluten

III. Beer Flavor and Evaluation

A. Taste and flavor
   1. How we perceive flavor
      a. Aroma
      b. Taste
         i. Established
            - Sweet
            - Salty
            - Sour
            - Bitter
            - Umami
         ii. Emerging
            - Fat
      c. Mouthfeel
         i. Body
         ii. Carbonation
   2. Beer evaluation
      a. Temperature
         i. Beer reveals more flavor as its temperature increases and should be served between 38 and 55 °F (3–13 °C) depending upon its style
      b. Components of evaluation
         i. Appearance
         ii. Aroma
         iii. Taste
         iv. Mouthfeel
         v. Finish/Aftertaste
      c. Key evaluation techniques
         i. Aroma techniques
            - Distant Sniff: Swirl beer while holding glass 6–8 in (15–20 cm) away from nose and take one to two short sniffs
            - Drive-by Sniff: Swirl beer; slowly pass glass across your face, underneath your nose; take a few short sniffs as the glass passes by
            - Short Sniff: Swirl beer; bring glass to nose and take one to two short sniffs
            - Long Sniff: Swirl beer; bring glass to nose and take one long sniff
            - Covered Sniff: Cover glass with hand; swirl beer for 3 to 5 seconds; bring glass to nose, remove hand, and sniff
         ii. Use a consistent background to assess the color and clarity of the beer
         iii. Beer should reach all parts of the tongue during tasting
         iv. Flavor perception continues after swallowing

B. Identify normal flavors of beer and their source
   1. Malt and grain flavors
      a. Pale beer: Uncooked flour, bread dough
      b. Golden beer: White bread, wheat bread, water cracker
      c. Light amber beer: Bread crust, biscuit, graham cracker
      d. Amber beer: Toast, caramel, pie crust
      e. Brown beer: Nutty, toffee, chocolate, dark/dried fruit
      f. Black beer: Roast, burnt, coffee

2. Hop flavors
    a. Bitterness, flavor, and aroma effects
    b. Traditional regional hop traits
        i. American: Piney, citrus, resiny, tropical fruit, catty, onion/garlic
        ii. English: Earthy, herbal, woodsy
        iii. German/Czech: Floral, perfumy, peppery, minty
3. Fermentation flavors
    a. Ale versus lager flavors (See Ingredients section IV.A.3.a)
    b. Weizen yeast flavor
    c. Other yeast and bacteria can contribute to beer flavor

C. Off-flavor knowledge
1. Oxidation
    a. Diminished hop flavor and aroma
    b. Malt shift towards honey, caramel, toffee, etc.
    c. Papery/wet cardboard
    d. Waxy/lipstick
2. Lightstruck/skunky
3. Dirty draft lines
    a. Buttery
    b. Sour

IV. Beer Ingredients and Brewing Processes

A. Ingredients
1. Grains
    a. Malt
        i. Malt is produced by sprouting and drying cereal grains such as barley or wheat
        ii. Different shades and flavors of malt are produced by variations in kilning
    b. Unmalted grains such as corn or rice are sometimes used in beermaking
2. Hops
    a. Hop character in beer
        i. Depending on use, hops can contribute bitterness, flavor, and/or aroma
        ii. Aroma and flavor vary with variety
        iii. Dry hopping
            - Process of adding hops after the wort is chilled, typically in the fermenter, conditioning tank or serving vessel
                - The primary goal is to increase hop flavor and aroma, not to add bitterness
                - A brewer may repeat the dry hopping process multiple times for added effect
                    a. Often indicated with terms like Double Dry Hopping (DDH) or Triple Dry Hopping (TDH)
    b. Basic anatomy of hop plant and cone
    c. Major growing regions
        i. Germany
        ii. Czech Republic

iii. Britain
iv. United States
- Yakima Valley, Washington
- Oregon, Idaho

v. Australia
vi. New Zealand

3. Yeast
   a. Taxonomy
      i. Ale yeast
         - *Saccharomyces cerevisiae*
         - Generally produce esters in levels which give fruity flavors to finished beers
         - Some strains possess a certain gene which results in production of phenolic flavors such as clove, nutmeg, white pepper
      ii. Lager yeast
         - *Saccharomyces pastorianus* also known as *Saccharomyces carlsbergensis*
         - Generally do not produce esters or phenols in appreciable quantities, resulting in a focus on malt and hop character
   b. Other yeast and bacteria can contribute to beer flavor
4. Water
   a. Water makes up 90+% of the weight of beer
   b. All water contains traces of minerals
      i. Many are essential to beer production
      ii. Several have desirable flavor impacts
      iii. Some have undesirable flavor impacts
   c. Modern brewers adjust water chemistry to fit the requirements of the beer they brew

B. Brewing Process Overview
1. Milling
   a. The act of physically crushing or grinding malt and other grains in a mill, producing grist
2. Mashing
   a. Grist is mixed with hot water
   b. Enzymes in the malt break down starches into sugars
3. Lautering
   a. The sweet liquid, called wort, is separated from the spent grains
      i. Sugars, color, and flavor compounds are extracted
4. Boiling
   a. Wort is boiled in the brew kettle
      i. Hops are added to impart bitterness, flavor, and aroma
      ii. Wort is sterilized
5. Whirlpool
   a. Wort is spun to separate hop fragments and solid particles from the hot wort
6. Chilling
   a. Wort is cooled to fermentation temperature
7. Fermentation

   a. Yeast is pitched into the cooled wort
   b. Yeast then consumes sugars, creating:
      i. Alcohol
      ii. CO_2
      iii. Flavor compounds
8. Maturation/Lagering
   a. Immature beer is rested to promote the removal of undesirable flavors
9. Clarification
   a. Separation of yeast and other solids from the beer using a variety of methods
10. Carbonation
   a. CO_2 levels in the beer are adjusted to desired level
11. Packaging
   a. Cans
   b. Bottles
   c. Kegs

V. Pairing Beer with Food

No single model perfectly explains all the dynamics of beer and food pairing. Candidates at this level should understand that beer and food work well together, but do not need to possess knowledge of specific beer and food interactions.