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SCHOOL OF FOOD AND WINE STUDIES
DEPARTMENT OF BAKING AND PASTRY
COURSE TITLE: PRECISION PASTRY ARTS AND FROZEN DESSERTS PRODUCTION
COURSE CODE: FWBPPP490
3 semester credits

1. DESCRIPTION

This course explores stimulating applications of both classic and contemporary pastry techniques to pastry shop and à la carte restaurant production. The program focuses on the following main topics: the use of freezing temperatures through a survey of the possible applications in which precise and specific temperatures and ingredients are balanced and play a fundamental role; handling fresh and seasonal fruits in pastry production; the increasing use of ingredients such as thickening and gelling agents in order to create products with unexpectedly smooth textures; a wide variety of gels and contemporary mousses; and pastry applications of molecular gastronomy. Through this experience, students will understand the role of specific ingredients in ice production in order to serve frozen desserts with a perfect balance between texture and temperature.
The course will address professional techniques of pastry arts classics such semifreddo, bomba gelato, parfait, and bon-bons. Special emphasis will be placed on the use of liquid nitrogen for varied purposes other than freezing, such as the stimulating effects of carbonation on food flavor perception and the application of frozen food processing with the Pacojet food processor. The course offers a full immersion in pastry lab production with an important focus on techniques that can be available in a professional environment and allow pastry chefs to develop their creativity and reach new unexpected results.

2. OBJECTIVES

The aim of the course is to introduce students to the new frontiers of cookery by a full immersion in the science of cooking that has developed during the last decades and changed culinary art dramatically like many other past revolutions did. Students will have the possibility to practice with instruments and materials that can be usually seen only in books or on television and understand the great potential of modernist cookery. The course offers the possibility to understand how flavors, textures and visual appearance of food can be impacted by using specific techniques and ingredients.

Upon the successful completion of the course students will be able to:
Understand there is chemistry behind every single food preparation either prepared following the traditional methods or the contemporary techniques
Understand that the application of modernist techniques and ingredients is not a deflection from cooking but just its natural evolution
Understand the advantages of specific temperatures on the development of textures and flavors once impossible to reach with traditional methods
Apply natural additives for the creation of food with unexpected textures, flavors and temperatures
Gain knowledge of techniques that will widen their creativity

Understand the suitable applications of the learned techniques in a restaurant menu and the advantages most of these techniques offer in terms of food cost control

3. REQUIREMENTS

Prerequisite: Baking Techniques II: Italian Pastry Techniques or equivalent.

4. METHOD

This course consists of lectures, class discussions, projects, and site visits within the local community. Mediums for instruction used will include, but are not limited to, interactive and hands-on activities which challenge thought processes, academic texts and studies, videos, slides, guided problem solving, and experiential and/or field learning activities where applicable.

5. TEXTBOOK – FURTHER READINGS – RESOURCES

TEXTBOOK:

Modernist cuisine - Myhrvold-Young-Bilet - The Cooking Lab

The textbook is mandatory for successful completion of the course.
Where applicable, additional materials, handouts and/or notes will be provided by the instructor.

FURTHER READINGS

On food and cooking: the science and lore of the kitchen - Harold McGee - Hodder&Stoughton
The flavor thesaurus - Niki Segnit - Bloomsbury
Molecular Gastronomy: exploring the science of flavor - Herve This - Columbia University Press
The science of cooking - Peter Barham - Springer
Gillian Riley - The Oxford Companion to Italian Food - Oxford University Press
C. Ingram - The World Encyclopedia - Cooking ingredients - Annes London

LIBRARIES IN FLORENCE

Please consult the posted schedules for official opening times of the university library. Also note that the library is for consultation only and it is not possible to borrow materials. The library is equipped with a scanner and internet access so that you may save or email a digital copy of the pages needed.
Students may also utilize additional libraries and research centers within the local community:

BIBLIOTECA PALAGIO DI PARTE GUELFA

Located in Piazzetta di Parte Guelfa between Piazza della Repubblica and Ponte Vecchio. Please consult the library website for hours of operation:
http://www.biblioteche.comune.fi.it/biblioteca_palagio_di_parte_guelfa/

BIBLIOTECA DELLE OBLATE

Located in via dell'Oriuolo 26. Please consult the library website for hours of operation:
www.bibliotecadelleoblate.it

THE HAROLD ACTON LIBRARY AT THE BRITISH INSTITUTE OF FLORENCE

Located in Lungarno Guicciardini 9. Please consult the library website for hours of operation. This library requires a fee-based student membership. For information: www.britishinstitute.it/en

6. FIELD LEARNING

Please consult your Official Registration for any mandatory field learning dates. Field Learning Activities cited in Official Registrations are an integral part of the course and also include an assignment that counts towards your final grade, details will be provided on the first day of class.

7. COURSE MATERIALS

Professional Cooking courses

(NOTE: STUDENTS MUST ALSO ADHERE TO KITCHEN RULES OUTLINED IN THE GANZO/FEDORA BOOKLET)

Professional cooking classes

1. All students are strictly required to attend class wearing a clean uniform: the jacket provided by the institution, black pants, apron (color depending on the CA level), safety footwear, a white Chef's hat, and a set of knives. Students with long hair should tie hair back before wearing the hat. Students are not allowed to wear rings, earrings or any other visible piercings, bracelets, watches, and nail polish during lab hours. Students who are not dressed properly will not be allowed in class.
2. All students must attend class fully prepared and on time. Late students will not be accepted.
3. Carefully wash hands at the beginning of each class, before food is handled.
4. During professional cooking classes only small food tastings are allowed as the main purpose of these courses is to develop technical skills. Students are not allowed to take food out of the kitchen.
5. Students are also required to participate in a polite and responsible way. Students are not allowed to sit on the working stations. Students who disturb lessons or are disrespectful to the instructor or the other students will be asked to leave the class. Serious infractions will be evaluated by the Academic Office.
6. Cooking classes will include various tasks which all students must carry out. Classes will include all different types of recipes and students are expected to actively participate in all lessons regardless of personal likes or dislikes.
7. Each student is responsible for washing all utensils used during class and keeping the working station clean and tidy, with all the utensils as listed in the station inventory. Two students at a time will tidy up the kitchen common areas during each class.
8. Students are responsible for kitchen utensils and maintenance of the equipment. The cost of a) any missing utensil b) damages due to student carelessness will be shared by all students.
9. No visits are allowed in class at any time.
10. The use of cellular phones is not allowed within the school building.

Should students wish to store materials or equipment, lockers are available with a deposit (given back after returning the key).

8. COURSE FEES

Course fees cover course-related field learning activities, visits, and support the instructor's teaching methodologies. Book costs are not included in the course fee. The exact amount will be communicated by the instructor on the first day of class.

9. EVALUATION – GRADING SYSTEM

10% Attendance
30% Class Participation and Assignments
20% Midterm Exam, Field Learning project (if applicable), Special/Research Project (if applicable), Practical Performance (if applicable)
20% Final Exam
20% Paper/Project

A = 93-100 %, A- = 90-92%, B+= 87-89%, B = 83-86%, B-=80-82%, C+ = 77-79%, C=73-76%, C-=70-72%, D = 60-69%, F= 0-59%, W = Official Withdrawal, W/F = Failure to withdraw by the designated date.

10. ATTENDANCE – PARTICIPATION

Academic integrity and mutual respect between instructor and student are central to the academic policy and reflected in the attendance regulations. Student presence is mandatory and counts toward the final grade.

Absences are based on academic hours: 1 absence equals 3 lecture hours.
Two absences: 6 lecture hours, attendance and participation grade will be impacted.
Three absences: 9 lecture hours, the final grade may be lowered by one letter grade.
Four absences: 12 lecture hours, constitutes automatic failure of the course regardless of when absences are incurred.
Please note:
- The above hours refer to lecture hours. Please note that the contact / credit hour policy in the academic catalog includes additional distribution ratios according to delivery category. Ex: 1 absence equals 6 FL/SL/Lab hours or 9 EL hours.
- Hours may be distributed in different formats according to the academic course schedules.

LATE ARRIVAL AND EARLY DEPARTURE

Arriving late or departing early from class is not acceptable. Two late arrivals or early departures or a combination will result in an unexcused absence. Travel is not an exceptional circumstance.

TRAVEL (OR DELAYS DUE TO TRAVEL) IS NEVER AN EXCUSE FOR ABSENCE FROM CLASS.

It is always the student's responsibility to know how many absences he or she has in a course. If in doubt, speak with your instructor!

Participation: Satisfactory participation will be the result of contributing to class discussions by putting forth insightful and constructive questions, comments and observations. Overall effort, cooperation during group work, proper care of work space and tools, responsible behavior, and completion of assignments will be assessed. All of the above criteria also apply to Field Learning and site visits.

11. EXAMS – PAPERS – PROJECTS

Final Paper/Project
Format, guidelines and due dates will be available on the course website.
Material for research will be available the university library.
The Final Project accounts for 20% of the course grade.

The **Final** exam accounts for 20% of the final course grade and it consists of a written and a practical test. For exam time and date consult the course addendum. **The time and date of the exam cannot be changed for any reason.**
Format: the written exam is divided into three sections:

- Part I: 10 Multiple choice questions. Each correct answer is worth 2 points, for a total of 20 points.
- Part II: 6 short-answer questions. Each correct and complete answer (concise explanations, main ideas, key words, names, etc.) is worth 10 points, for a total 60 points.
- Part III: 1 essay question

The practical test will be decided by the Chef instructor. See information on the course addendum.
The Final Exam is cumulative.

12. LESSONS

Lesson 1	
Meet	In class
Lecture	**Introduction to the course** The development of cuisine in the history of mankind - Evolution of cooking and cooking revolutions across the centuries - Molecular gastronomy and how it changed the way we think about food - The modernist revolution and the new scientific approach to cooking - The Modernist Cuisine Manifesto - Modernist cuisine in France, Spain, England and United States: differences and common grounds **The "modernist" kitchen** - How the contemporary revolution changed the kitchen layout. The modernist cuisine equipment: kitchen, lab, or both? - Thickeners, hydrocolloids, gels, gums, enzymes, centrifuge, cryogenic freezing: psychological barriers at the base of the understanding of modernist revolution
Objectives	Understand the development of cuisine through the great revolutions that occurred during centuries - Understand the importance of considering the modernist revolution as the latest step in culinary evolution, and not just a deflection from cooking - Learn the importance of precision instruments and technical equipment
Readings/ Assignments	TB - From origins of cooking to the modernist revolution pp. 1-6 > 82 On food and cooking - Harold McGee - INTRODUCTION pp.1-5 - THE FOUR BASIC FOOD MOLECULES Ch.15 - A CHEMISTRY PRIMER Appendix pp.811-818

Lesson 2	
Meet	In class
Lecture	**Cryogenic freezing - Pastry applications of liquid nitrogen** Definition of liquid nitrogen and chemical features - Applications of liquid nitrogen for cuisine and pastry - Cryogenic freezing for shattering, powdering, and poaching - Decorating food with the help of liquid nitrogen: shaping fat or viscous materials, disassembling fruits - Safe handling of cryogens Focus on contemporary ice production with liquid nitrogen The new frontiers of texture: application of liquid nitrogen - Liquid nitrogen features and possible risks - Micro-crystal dimensions to the extreme - Effects of liquid nitrogen on alcoholic bases - Liquid nitrogen application to contemporary service
Objectives	Become confident with liquid nitrogen application - Understand the purpose of liquid nitrogen to reduce the dimension of ice crystals - Understand that liquid nitrogen gelato/sorbet/granita is suitable for a specific type of service - Learn the potential of liquid nitrogen application to alcoholic based creations
Lab	Buontalenti *nitro* ice cream - Nitrocappuccino - Liquid nitrogen application for decorations
Readings/ Assignments	TB pp. 2-456 / 2-463

Lesson 3	
Meet	In class
Lecture	**Carbonation - Carbonating with dry ice, carbon dioxide, sodium bicarbonate, Peta Zeta and Fizzy** Definition of carbonation - Carbonating with carbon dioxide and dry-ice: methods and suggestions - The chemistry of fizziness: why do our taste buds detect carbonation as sour? - The importance of temperature for carbon dioxide dissolving - Applications of carbon dioxide: carbonating liquid and solid foods - Carbon dioxide for food preservation - Combination of sodium bicarbonate and acidity for fizziness - Application of contemporary additives for fizziness - Safe handling of cryogens
Objectives	Understand the application of carbonation in the development of pastry creations - Understand how fizziness influences flavor perception - Learn how to apply carbon dioxide, dry ice and contemporary additives to sweet creations - Learn how to combine acid and base compounds to obtain fizziness
Lab	Carbonating fruit with carbon dioxide TB p. 2-469 - Application of carbon dioxide for preservation and storage TB p. 2-471 - “Volcano” dessert with dry ice - Fizzy pralines with sodium bicarbonate
Readings/ Assignments	TB pp. 2-464 > 473

Lesson 4	
Meet	In class
Lecture	**Semifreddo** Definition of semifreddo - The importance of sugar as antifreeze in semifreddo preparation - The role of air for semifreddo consistency at -18°C Application of Italian meringue as the solid base of a semifreddo - Coagulation of proteins in Italian meringue - Meringue dehydration The importance of avoiding fats during albumen foaming: fats as inhibitors of protein development Adding flavors to meringue: powdered natural aromas or water-based flavorings Semifreddo shelf-life: the importance of sugar as a preservative - Application of alternative sugars and antioxidants for longer shelf-life: glucose syrup, inverted sugar, ascorbic acid
Objectives	Understand the features of semifreddo and its composition - Understand the role of sugar as antifreeze and a preservative ingredient in order to combine temperature and texture - Understand the role of air in semifreddo structure - Learn which the suitable flavorings are that can be incorporated into semifreddo mixture - Learn why fats should be avoided to guarantee a correct foaming of the meringue
Lab	Raspberry and pistacchio semifreddo - Hazelnut and lemon semifreddo
Readings/ Assignments	See additional material on the course website

Lesson 5	
Meet	In class
Lecture	**Stuffed fruit ices** Definition of stuffed fruit ices - The importance of seasonality in the preparation of stuffed fresh fruits - Features of ice cream for stuffings: water and milk-based ice cream - Less application of fats to preserve fresh fruit flavor Stuffed fresh fruits production process: how to pre-treat fresh fruit - Freezing, thawing and boiling the “shells” to break fruit fibers - Application of stabilizers and alternative sugars for a perfect consistency: dextrose, sorbitol, xanthan gum and guar gum
Objectives	Understand the characteristics of stuffed fruit ices - Understand why seasonality is fundamental for stuffed fruit ice production - Learn how to produce low-fat pastry shop ices - Learn the step by step process for production - Learn how to apply alternative sugars and thickeners to obtain the proper consistency and shelf-life
Lab	Stuffed fresh fruits according to seasonal availability
Readings/ Assignments	See additional material on the course website

Lesson 6	
Meet	In class
Lecture	**Bon Bon** Definition of bon bon: ices applied to pastry - Bon bon as a variation of the classic chocolate praline - Bon bon structure: ice, filling and chocolate coverture - Creamy or crunchy filling applications - Ices flavoring through osmosis and migration - Application of anhydrous butter to chocolate coverture for better elasticity at freezing temperatures
Objectives	Understand the composition and structure of bon bon - Learn that a bon bon is an application of ices to a pastry classic: a frozen praline - Learn how to combine filling, ice and chocolate coverture - Learn the advantages of anhydrous butter to chocolate for a perfect elasticity at freezing temperatures
Lab	Violet flower and pear - Caramel and pine nut - Mint and almond Bon Bons
Readings/ Assignments	See additional material on the course website

Lesson 7	
Meet	In class
Lecture	MIDTERM EXAM

Lesson 8	
	BREAK

Lesson 9	
Meet	In class
Lecture	**Semifreddo variation: Parfait** Definition and basic ingredients of parfait - Egg and sugar foaming as the base of parfait - The role of sugar and fats as antifreeze in parfait preparation - The importance of a proper foaming for the perfect consistency at freezing temperatures: soy lecithin application to egg foaming - Coffee and other liquid ingredient application: how to avoid excessive ice crystals formation
Objectives	Understand the differences between classic semifreddo and parfait - Understand the role of egg and sugar foaming in parfait structure - Learn the advantages of soy lecithin application in order to guarantee a stable egg foaming - Learn how to avoid excessive ice crystal formations when combining liquid ingredients
Lab	Coffee and Sambuca parfait - “Crema e cioccolato” parfait
Readings/ Assignments	See additional material on the course website

Lesson 10	
Meet	In class
Lecture	**Modernist ice cream with a stick** Evolution of ice cream with a stick from the classic pinguino to the Magnum - Liquid nitrogen application for molded ice creams production - Layering techniques - Application of gelling agents for glazing - Chocolate glazing with anhydrous butter - How to add flavor to chocolate glazes for ice cream production
Objectives	Learn how to produce ice cream for molded creations - Get confident with timing and temperature management - Learn flavoring techniques for anhydrous butter - Understand how to avoid cracking when freezing chocolate glazes - Learn how to reach the perfect chocolate viscosity for glazes - Identify suitable gelling agents for frozen desserts
Lab	Rosewater, raspberry, pistacchio and white chocolate - Milk chocolate lime and sechuan pepper glaze, mango, coconut, peanuts
Readings/ Assignments	See additional material on the course website

Lesson 11	
Meet	In class
Lecture	**Bomba gelato** Definition and features of "bomba gelato" - How to combine preparations with different density, consistency and thawing temperatures - Density contamination: application of different types of glazing as insulation between different layers of filling - Application of ganache, ices, mousses and gels in bomba gelato production - Suitable colors and flavors combinations
Objectives	Understand the characteristics of bomba gelato - Learn how to combine elements with different consistencies and thawing temperatures - Understand the composition of the suitable glazes applied to insulate different layers of fillings - Learn how to compose a bomba gelato combining consistencies, flavors and colors
Lab	Banana, amarena cherry ice cream and pear cremoso - Apple cremoso, caramel and cinnamon ice cream
Readings/ Assignments	See additional material on the course website

Lesson 12	
Meet	In class
Lecture	**Avantgarde in pastry: application of scientific knowledge in pastry arts** Understand the importance of the ingredients 'chemistry for a complete comprehension of the applied techniques - Learn the importance of a new style of mise en place in order to be able to guarantee precise textures, standardized flavors, and service timing all at the same time Focus on foams: the whipping syphon modernist applications Food processor application in "pastry-style" sorbets and ice cream preparation Use of microwave for modernist spongecake cooking Use of the syphon to reach new textures and lighten flavors
Objectives	Understand the new scientific approach to cooking and pastry - Learn the characteristics of foams - Understand what a foaming agent is - Learn how to use the whipping syphon - Learn the suitable gases to charge a whipping syphon - Become confident with the production of aerated sorbet with a food processor - Learn how to apply the microwave oven to modernist pastry recipes
Lab	Aerated coffee sorbet (food processor) - Modernist cocoa sponge cake - Mascarpone foam - Cocoa syrup
Readings/ Assignments	On Baking - Ch. 17

Lesson 13	
Meet	In class
Lecture	**Pastry classics…re-invented** Aerated mousse: Chantilly evolution - Focus on phospholipids: soy lecithin Definition of phospholipids and their suitable applications Use of soy lecithin in chantilly cream preparation as a substitute for sugar: how lecithin helps to stabilize the foam - Application of lecithin into flavored chantilly cream: advantages of the perception of flavors Advantages of producing sugar-free chantilly for special dietary requirements
Objectives	Understand the role of soy lecithin application to produce a sugar-free chantilly cream and the variety of applications to classic and contemporary desserts - Understand how the absence of sugar can enhance flavor perception - Understand the importance of offering products for special dietary requirements
Lab	Sugar-free chantilly cream - Mint and lime sugar-free chantilly cream - Celery and raspberry sugar-free chantilly cream
Readings/ Assignments	TB pp. 4-38 > 47

Lesson 14	
Meet	In class
Lecture	**Spherification** Direct and reverse method Definition and origin of spherification - How spherification works: hydrocolloid-ion reaction - Reaction between alginate and a calcium ion coagulant: step-by-step procedure - Differences between direct and reverse method and applications to a variety of ingredients - Tips on how to leave the sphere center liquid Cryospherification in both direct and reverse method
Objectives	Understand how spherification works and the chemistry that is at the base of the system - Features of alginate and calcium ions - Understand the differences between direct and reverse method and the different applications - Learn how to produce various sizes of sphere with a variety of flavors and ingredients - Learn how to stop the setting of the liquid inside the spheres - Learn the possible applications of spherification to contemporary pastry
Lab	Sunny side up… egg? - Pasta reale, lime pearls, mint and chocolate flakes - Irish coffee - Mint mousse filled with Mojito sphere
Readings/ Assignments	TB pp. 4-184>194

Lesson 15	
Meet	In class
Lecture	FINAL EXAM - Final exam