**FST 1202 FOOD CHEMISTRY 1**

***Course instructors***

* *Dr. Y B Byaruhanga [BSc. Food Sc & Tech; M.S. Food Sc.; PhD. Food Sc.]*

***Course type:***

*Core course for Year 1 BSc. Food Science & Technology*

1. ***Course structure***

***Course credits (CU):*** *3 CU i.e. 3 contact hours per week per semester*

***Course duration:*** *15 weeks (45 contact hours) – 30 lecture hours; 30 practical hours*

***2. Course description***

Composition, physical and chemical properties of food components: water, proteins, carbohydrates and lipids vitamins, minerals, pigments, flavourants, additives and enzymes. Forms of water of foods. Water absorption phenomena, freezing and ice structures and water activity.

***3. COURSE OBJECTIVES***

***General objective***

*This course is aimed at giving students a foundation in the chemistry of food*

***Specific objectives***

* **Introduce students to general concepts and principles in the chemistry of food**
* **Equip students with competences in the composition of foods**
* **Equip students with competences in the structure and chemical properties of foods components**

***4. RECOMMENEDED REFERENCES***

1. **Food chemistry 3rd edition. OR Fennema (ed). Marcel Decker; 1996.**
2. **Water activity and Food. JA Troller and JHB Christian (eds). Academic Press; 1978.**
3. **Principles o Food Chemistry 3rd edition. JM deMan. Springer; 1999.**
4. **Chemistry of Food components. PMT Hansen. DFST Mak; 1998.**
5. *Selected articles from Journal of Food Science*

***5. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT***

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| ***TOPIC*** | ***CONTENT*** | ***METHOD OF INSTRUCTION/ Time allocation*** | ***TOOLS/ Equipment needed*** |
| *Introduction* | *-What is food chemistry about?**-Elements of food chemistry**-Why do we learn food chemistry?**Introduction to different food categories and food components* | *-Interactive lectures coupled with homework and assignments**2 hr)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Various Food samples Functional food chemistry lab**Chemical reagents*  |
| *Carbohydrates* | *-Over view of Mono-, oligo-, and poly- saccharides**Types properties & reactions of* *-Sugars* *-Starch**-Cellulose**Basic properties & reactions of mono- & oligo-saccharide**Starch extraction & basic starch reactions and properties* | *-Interactive lectures coupled with homework and assignments**(4 hrs)**-Practical (3 hrs)**-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Food samples (fruits, starchy foods)**Functional food chemistry lab**Chemical reagents*  |
| *Types properties & reactions of* *-Gums**-Pectins**-Dietary fiber**Demonstration of basic gums and pectin properties* | *-Interactive lectures coupled with homework and assignments**(2 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Fruits, vegetable & grain food samples Functional food chemistry lab**Chemical reagents* |
| *Quiz* |
| *Proteins* | *-Over view of amino acids, polypeptides and proteins**-Protein structure**-Types & reactions of proteins* | *-Interactive lectures coupled with homework and assignments**(2 hrs)* | *-LCD projector/White boards/flip charts*  |
| *-Functional properties of proteins**-Enzymes**Demonstration of the emulsification and water holding properties of protein* | *-Interactive lectures coupled with homework and assignments**(4 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Eggs & gelatin samples Functional food chemistry lab**Chemical reagents* |
| *Quiz* |
| *Lipids* | *-Over view of Fatty acids & Glycerides**-Properties & reactions of lipids**-Types of lipids**Lipid extraction and basic reactions of lipids* | *-Interactive lectures coupled with homework and assignments**(4 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Samples of plant and animal lipid sources Functional food chemistry lab**Chemical reagents* |
| *Quiz* |
| *Water*  | *-The water molecules and how they associate**-Water solute interactions* *Demonstration of pure and colloidal water based solutions* | *-Interactive lectures coupled with homework and assignments**(2 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Samples of pure and colloidal solutes**Functional food chemistry lab**Chemical reagents* |
| *-Water activity**-Moisture sorption isotherms**Demonstration of moisture content vis-avis water activity*  | *-Interactive lectures coupled with homework and assignments**(2 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Samples of dry intermediate and wet foods Functional food chemistry lab**Chemical reagents* |
| *Mid semester test* |
| *Vitamins*  | *-Nature and types of vitamins in food**-Reactions of vitamins* *-Technological applications of vitamins*  | *-Interactive lectures coupled with homework and assignments**(2 hrs)*  | *-LCD projector/White boards/flip charts*  |
| *Minerals* | *-Nature and types of minerals in food**-Properties & reactions of minerals**-Technological applications of minerals*  | *-Interactive lectures coupled with homework and assignments**(2 hrs)*  | *-LCD projector/White boards/flip charts*  |
| *Quiz* |
| *Pigments and flavourants* | *-Nature and types of pigments & flavours in food**-Reactions of pigments & flavours**-Technological applications of pigments & flavours**Extraction and properties of natural plant pigments* | *-Interactive lectures coupled with homework and assignments**(2 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Samples of pigmented and flavoured plant foods* *Functional food chemistry lab**Chemical reagents* |
| *Additives* | *-Nature and types of additives in food**-Reactions of additives**-Technological applications of additives* *Demonstration of different food additives* | *-Interactive lectures coupled with homework and assignments**(2 hrs)* *-Practical (3 hrs)* | *-LCD projector/White boards/flip charts* *Samples of different food additives**Functional food chemistry lab**Chemical reagents* |
| *Quiz*  |
| *Final Exam* |

***6. SUMMARY OF TIME (as contact hours) NEEDED***

* *Lecture hours 30 hr*
* *Practicals 30 hr*

***7. OVERALL COURSE EVALUATION/ASSESSMENT***

* + *Assignments (at least four assignments) 15%*
	+ *Practicals and class attendance 15%*
	+ *Quizzes (at least four quizzes) 10%*
	+ *Course test (at least one course test) 10%*
	+ *Final exam 50%*