

Course Title: Functional Biology II

Course Code: FST-1104

Resource Person:

Department: Food Science and Technology

School of Food and Agricultural Sciences (SFAS) Vision

SFAS endeavors to be a premier center of excellence, offering innovative, high-quality education and professional programs aimed at achieving academic and research excellence, enriching the lives of individuals and making a difference in the world of academia and industry, and to develop a society of professionals, who can contribute towards the betterment of their respective communities.

SFAS Mission

SFAS Mission SFAS provides an intellectually rich, collaborative, research-focused and dedicated learning environment for students, faculty, and staff, while serving the community at various levels. SFAS at UMT has been established with the aim to integrate recent advances in food sciences/technology and agricultural innovations.

Program Learning Objectives (PLO's)

Students graduating with BS Food Science and Technology shall be able to:

1. *Explain the basic principles of food sciences, and its multidisciplinary scope.*
2. *Explain the physical, chemical and biological properties of food and their effects on food safety, and sensory and nutritional quality.*
3. *Apply analytical techniques to characterize composition, and to identify physical, chemical and biological changes in foods.*
4. *Explain the effects of food processing, engineering, preservation, packaging, and storage on food safety and quality.*
5. *Identify the importance of food laws and regulations in ensuring safety and quality of the processed/manufactured foods.*
6. *Conduct applied research and use statistical tools in experimental design and data analysis.*
7. *Apply acquired knowledge to real world situations in food systems, components, production, and processes.*
8. *Apply critical thinking to professional problems.*
9. *Communicate effectively in both oral and written forms.*
10. *Develop organizational, teamwork, and leadership skills.*
11. *Demonstrate professional skills and thoughts of ethical, social integrity, and respect for diversity.*
12. *Demonstrate preparedness for continued reflective practice, and lifelong learning relevant to careers in food sciences.*

Course Objectives (CLO's)

After the completion of this course, a student will be able to:

1. Understand the importance of functional biology and its role in the human life
2. Explain the chemistry and chemical processes related to the cells
3. Describe the cells and role and function of different parts of cells
4. Elaborate the working and energy generation related to the cells
5. Explain the cellular respiration and process of photosynthesis
6. Describe the process of reproduction and evolution.

Learning Objectives

Sr#	Course Learning Objectives	Link with Program Learning Objectives
1.	Understand the importance of functional biology and its role in the human life	Students will easily understand the importance of the biology and its role in the human life and related sciences.
2.	Explain the chemistry and chemical processes related to the cells	Students will easily understand the importance of the biology and its role in the human life and related sciences.
3.	Describe the cells and role and function of different parts of cells	Students will easily understand the importance of the biology and its role in the human life and related sciences.
4.	Elaborate the working and energy generation related to the cells	Students will easily understand the importance of the biology and its role in the human life and related sciences.
5.	Explain the cellular respiration and process of photosynthesis	Students will easily understand the importance of the biology and its role in the human life and related sciences.
6.	Describe the process of reproduction and evolution.	Students will easily understand the importance of the biology and its role in the human life and related sciences.

Course Learning Outcomes

After successful completion of the course work, students have the skills to:

1. *Comprehend the biology and its role in the human life.*
2. *Understand the chemistry and chemical processes related to the cells.*
3. *Explain the cells and role and function of different parts of cells.*
4. *Describe the working and energy generation related to the cells*
5. *Elaborate cellular respiration and process of photosynthesis.*
6. *Describe the process of reproduction and evolution.*

Teaching Methodology

Interactive classes:

1. *Use media to increase student engagement and improve learning outcomes.*
2. *Try adding metaphors to help students remember details.*
3. *Give students a real-world context with extra projects to reinforce skills.*
4. *Provide practical practice within your lessons. Making it relatable will do wonders.*

Case-based teaching:

Class Participation

Positive, healthy and constructive class participation will be monitored for each class. Particular emphasis will be given to participants during the presentation sessions. How the question is asked or answered will also be noted. Your behaviour, as business executives in the class will contribute to the class participation marks.

Word of Advice

Assignments/ projects are very demanding and time-consuming. Since you might be exposed to the real corporate environment, the ensuing reality checks could be demoralizing and frustrating. So, you must learn to handle intragroup conflicts and any clash of interests. Unless you start working on the assignments/ projects right away from the very first day you are likely to miss the deadlines.

Participant Responsibilities:

Students should be responsible enough to practice whatever they have learned during class sessions. They should also implement it to other subjects as well. They are expected to come prepared in the class.

Class activities:

Presentations

After careful analysis, resource person will constitute the groups to achieve balanced heterogeneity among groups, for group assignments/projects and will have the final decision in this regard. Every member of the group is expected to be able to handle all aspects of the assignments. Groups are not allowed to choose presenters for various parts of the presentations; instead, resource person will nominate them. Individuals will be judged for their understanding of the topic through question handling. Q/A section of the presentations will weigh heavily for grading of assignments/ projects.

Class Discussions:

During class, each student will work in a team on discussion questions. Teams will be assigned questions, allowed ten minutes for Internet research, and permitted five minutes to present their results. Points are earned by active participation with your team.

Applied Projects:

This is a practical-based course. Regular attendance is the best predictor of success. Students will perform different practices with detailed instructions, teacher demonstrations, and video tutorials.

STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK

Class Policy:

Be on Time

You need to be at class at the assigned time. After minutes past the assigned time, you will be marked absent.

Mobile phone Policy

TURN OFF YOUR MOBILE PHONE! It is unprofessional to be texting or otherwise.

Email Policy

READ YOUR EMAILS! You are responsible if you miss a deadline because you did not read your email. Participants should regularly check their university email accounts regularly and respond accordingly.

Class Attendance Policy

A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings are absences and will not be counted as present. You have the opportunity to use 6 absences out of 30 classes. Participants with less than 80% of attendance in a course will be given a grade 'F' (Fail) and will not be allowed to take end-term exams. International students who will be leaving for visas during semester should not use any days off except for visa trips. Otherwise, they could reach short attendance.

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Withdraw Policy

Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade W will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A student withdrawing after the 12th week shall be automatically awarded an "F" grade which shall count in the GPA.

Moodle

UMT –LMS (Moodle) is an Open-Source Course Management System (CMS), also known as a Learning Management System (LMS). Participants should regularly visit the course website on MOODLE Course Management system and fully benefit from its capabilities. If you are facing any problem using Moodle, visit <http://oit.umt.edu.pk/moodle>. For further query send your queries to moodle@umt.edu.pk.

Harassment Policy

Sexual or any other harassment is prohibited and is constituted as punishable offense. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

Use of Unfair Means/Honesty Policy

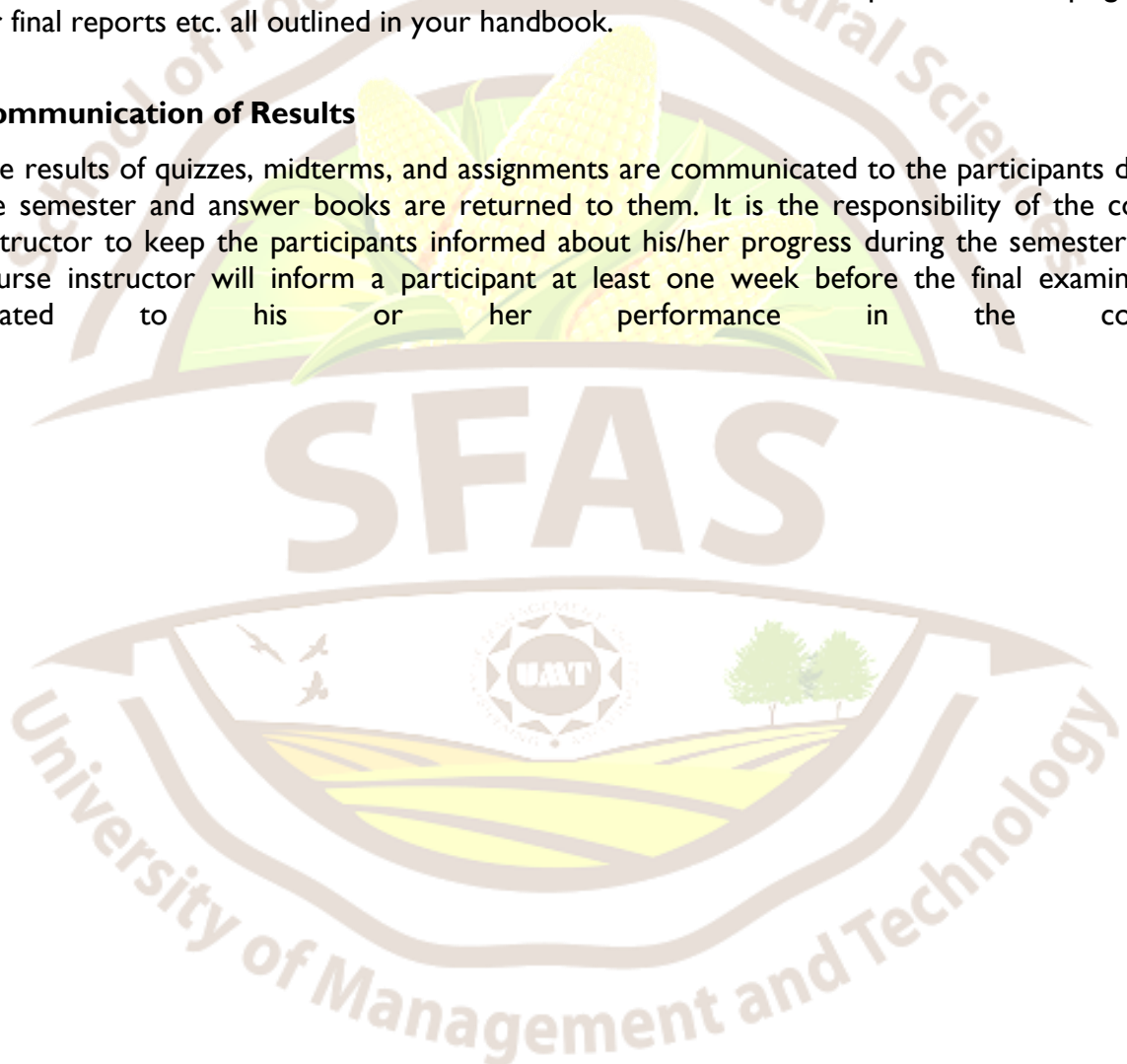
Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

Plagiarism Policy

All students are required to attach a “Turn in” report on every assignment, big or small. Any student who attempts to bypass “Turn in” will receive an “F” grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis, etc. If a student attempts to cheat “Turn in”, he/she will receive a second “F” that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.

Communication of Results

The results of quizzes, midterms, and assignments are communicated to the participants during the semester and answer books are returned to them. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.



Course Outline

Course code: FT-I101

Course title: Functional Biology I

Program	BS Food Science and Technology
Credit Hours	3 (2-1)
Duration	16 Weeks
Prerequisites (If any)	Functional Biology I
Resource Person Name and Email	
Counseling Timing & Room #	3 hours per week (STD 502)
Contact no.	-
Web Links	-

Director Programme Signature _____

Date _____

Dean's signature _____

Date _____

Grade Evaluation Criteria

Following are the criteria for the distribution of marks to evaluate final grade in a semester.

Marks Evaluation	Marks in percentage
Class Presentation	5%
Quizzes	10%
Assignments	10%
Class Project/Participation	5%
Lab	20%
Mid-Term	20%
Final exam	30%
Total	100%

Recommended Text Books:

1. Simon, E. J., Dickey, J. L., Hogan, K. A. and Reece, J. B. 2019. Campbell Essential Biology. Pearson, USA.
2. Begon, M., Howarth, R. W. and Townsend C. R. 2014. Essential Ecology. Wiley.
3. Taylor, M. R., Simon, E. J., Dickey, J. L., Hogan, K. A., and Reece, J. B. 2017. Campbell Biology Concepts and Connections. Pearson, USA.

Course: Functional Biology II

Course code: FST-II104

No	Topics to be covered in the course	Learning Objective of this topic	Expected Outcomes from Students	Teaching Method	Assessment Criteria	Deadlines and Homework
1	Introduction to functional biology, history, significance and major theories in biology, allied branches of biology	To define the biology To explain the need, importance and role of biology in life To familiar with the important branches of biology	Improve understanding of the biology and its related sciences	Lecture slides Short assignment	Class Participation	Within a Week
2	Essential Chemistry: elements, compounds, chemical bonding and molecules	To classify the role of chemistry in biology To explain the chemical bonding and interaction of molecules	Improve understanding of role and importance of chemistry in biology	Lecture slides Case study	Class Participation	Within a Week
3	Essential Chemistry: role of water in life, properties and significance	To learn the role of water in biology To demonstrate different properties and significance of water	Improve the understanding of role and importance of water	Lecture Video tutorial Lab practical	Class participation Lab performance	Within a Week
4	A tour of the cell: microscopic world of cell, categories of cells	Introduction to microscopic world of cell Learn the categories of cells	Improve the understanding of the cells and its categories	Lecture Literature review	Quiz Class participation	Within a Week
5	A tour of the cell: structure and function of membranes and cell parts	To describe the structure and function of cell To understand the cell parts	Students understanding will be improved by understanding the structure and function of cells	Lecture Literature review Video tutorial	Whiteboard test Quiz Case study	Within a Week

6	The Endomembrane Systems: Manufacturing and distribution of cellular products	To describe the importance of cell membrane systems To understand the distribution of cellular products	Improve the understanding regarding the process involved in the manufacturing and distribution of cellular products	Lecture Video tutorial Practical	Lab performance Case study Class participation	Within a Week
7	Energy transformation: chloroplast and mitochondria	To understand the energy transformation in the cells To familiar with the role and function of the chloroplast and mitochondria	Improve the understanding of energy transformation process in the cell			Within a Week
8	Revision & Mid Exams					
9	A working cell: ATP and cellular work	To familiar with the process of energy generation in the cell To understand the ATP generation and cellular working	Improve the understanding regarding the working of cell	Lecture Class discussions Video tutorial	Class projects Quiz Lab Performance	Within a Week
10	Cellular respiration: obtaining energy from food	To understand the cellular respiration in the cell To understand the processes involved in obtaining energy from food	Improve the understanding regarding cellular respiration	Lecture Quiz Surprise test Video tutorial	Whiteboard test Class projects Quiz	Within a Week
11	Photosynthesis, basic concept of photosynthesis, light reaction, chloroplast pigments	To familiar with the process of photosynthesis To understand the role and function of the light in	Improve the understanding regarding the process of photosynthesis	Lecture Assignment Lab practical	Whiteboard test Class projects Lab Performance	Within a Week

		photosynthesis and process involved				
12	Photosynthesis: making sugar from carbon dioxide	To understand about the sugar production from the carbon dioxide in photosynthesis	To improve the understanding regarding the production of sugar in photosynthesis	Lecture Slides Class discussions Class project	Whiteboard test Class projects Lab Performance	Within a Week
13	Cellular reproduction: Mitosis	To understand the process of cellular reproduction To describe the process of mitosis in the reproduction of cells	To enhance the understanding of the cellular reproduction			Within a Week
14	Cellular reproduction: Meiosis	To understand the process of meiosis in cellular reproduction	To improve the understanding regarding meiosis reproduction	Lecture Lab practical Video tutorial	Whiteboard test Quiz Lab performance	Within a Week
15	Evolution	To understand the evolution of life on earth	To enhance the understanding of the evolution of life on earth	<ul style="list-style-type: none"> · Class participation · Class projects · Q/A session 	Class presentation Viva	Within a Week
16	Final Examination	Application of all the concepts learned		On campus examination	Paper	Within a Week
Result Display						

Lab Component

During the course students will be able to perform the following practical in the laboratory:

Sr. No.	Experiment/Practical
1.	Food laboratories orientation
2.	General lab safety rules
3.	Familiarization to the different lab equipment
4.	Functioning of compound microscope
5.	Observation of paramecium under microscope
6.	Calories and energy calculation of different foods
7.	Usage of pH meter
8.	Observation of algae under microscope
9.	Observation of amoeba under microscope
10.	Examination of onion cells under microscope



University of Management and Technology

