AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Proteomics and Metabolomics: Overview and Significance of Medicine								
Course Code	BYK630		Couse Level		Third Cycle (Doctorate Degree)				
ECTS Credit	3	Workload	75 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The aim of this course is to enable students to learn the basic concepts of Proteomics, to have analytical thinking about proteins, proteomes are proteins produced by a cell or organism under certain conditions, how these molecules are related to each other and how they form a biological system and proteomics applications in other sciences.								
Course Content	Transcriptional regulation, genetic and protein interactions, tools and analytics, Sample preparation of pure and complex of biological materials, Protein expression and purification. Liquid chromatographic methods and mass spectrometry, 2D electrophoresis								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading	
1	Proteomic and Metabolomic Approaches to Biomarker Discovery:Haleem J Issaq
2	The Handbook of Metabonomics and Metabolomics:ohn C. Lindon,Jeremy K. Nicholson,Elaine Holmes
3	Introduction to Proteomics:Daniel C. Lieble

Week	Weekly Detailed Course Contents	
1	Theoretical	Transition from Genomics to Proteomics: Functional genomics at DNA and RNA level; Proteomics' field of activity; Proteomics challenges
2	Theoretical	General Properties of Proteins: Structure and Function of Proteins
3	Theoretical	Discrimination techniques used in proteome analysis (I): Principles of two-dimensional gel electrophoresis; Use of two-dimensional gel electrophoresis in proteomics
4	Theoretical	Discrimination techniques used in proteome analysis (II): Principles of liquid chromatography in proteomics; Multidimensional liquid chromatography
5	Theoretical	Techniques used for protein identification (I): Protein identification by antibodies; Determination of protein sequences by chemical degradation
6	Theoretical	Techniques used in protein identification (II): Use of mass spectrometry in proteomics; protein identification using mass spectrometry information
7	Theoretical	Techniques used for protein determination: Quantitative proteomics with standard two-dimensional gel; quantitative proteomics by mass spectrometry
8	Intermediate Exam	Proteomics and Metabolomics: Overview and Significance of Medicine Midterm Exam
9	Theoretical	Proteomics and analysis of protein sequences: Protein families and evolutionary relationships; Basic principles of protein sequence comparison
10	Theoretical	Structural proteome analysis: The importance of protein structures in proteomics; Techniques for understanding protein structures; Comparison of protein structures
11	Theoretical	Protein-protein interactions and proteomics: Principles of protein interaction analysis; Protein interaction maps; Proteins and small molecules
12	Theoretical	The role of protein modifications in proteome analysis: Phosphoproteomics, an overview of protein phosphorylation; Glycoproteomics, the role of glycoproteins in the cell
13	Theoretical	Protein chips and functional proteome analysis: Different types of protein chips; The emergence of protein chip technology
14	Theoretical	Proteomic Applications (I): Medical proteomics, disease diagnosis; Pharmaceutical proteomics, drug development
15	Theoretical	Proteomics Applications (II): Proteomics and plant biotechnology; Proteomics for the analysis of genetically modified plants
16	Final Exam	Proteomics and Metabolomics: Overview and Significance of Medicine Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	1	2	42
Midterm Examination	1	14	2	16
Final Examination	1	15	2	17
			Total Workload (Hours)	75
			[Total Workload (Hours) / 25*] = **ECTS**	3
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to learn that the proteome is the proteins produced by a cell or organism under certain conditions
2	To be able to understand how proteins interact and form a biological system
3	Describe the proteome as sequence, structure, abundance, location, arrangement, interactions and biochemical functions
4	Learning of protein separation, identification and determination principles
5	Learning basic information about proteomics database

Programme Outcomes *(Biochemistry (Medical) Doctorate)*	
1	To have basic theoretical knowledge about biochemistry and to help understanding biochemistry
2	To have the basic laboratory knowledge, apparatus and methods used in biochemistry
3	Analysis: To be able to analyze information critically
4	Synthesis: To be able to synthesize and adapt the knowledge in the field from different directions
5	Evaluation: To critically evaluate research in the field

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	5	5	5	5	5
P2	4	5	4	5	4
P3	5	4	5	4	4
P4	4	5	4	5	5
P5	5	5	5	5	5