



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Oxidative Stress, Free Radicals and Antioxidant Defense							
Course Code		BYK608		Coure Level		Third Cycle (Doctorate Degree)			
ECTS Credit	5	Workload	125 ( <i>Hours</i> )	Theory	2	Practice	2	Laboratory	0
Objectives of the Course		The aim of this course is to give the students the understanding of free radical types and radicalic reactions in biological systems, to give the students an understanding of oxidative damage which is one of the most emphasized subjects of science by giving basic information about free radicals							
Course Content		Normal metabolic function or examination of free radicals generated under stress conditions and effects of free radicals on cell signaling and gene expression. Relationships of oxidant and antioxidant. Free radical scavengers against the destructive effects of free radicals and antioxidants, Oxidative damage in connection with pathogenesis of aging and disease.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, 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	Oxidative stress: oxidants and antioxidants Helmut Sies
2	Cellular antioxidant defense mechanisms Ching Kuang Chow
3	B.Hallwell, J.M.C. Gutteridge, "Free Radicals in Biology and Medicine", fourth edition, Oxford Science Publications, 2007

Week	Weekly Detailed Course Contents	
1	Theoretical	Free Radicals
2	Theoretical	Types of free radicals; reactive oxygen species, reactive nitrogen species
3	Theoretical	Superoxide radical, hydroxyl radical (fenton reaction), ozone
4	Theoretical	Peroxy and alkoxy radical, nitric oxide radical, sulfur radical
5	Theoretical	Free radical formation, endogenous effects, exogenous effects
6	Theoretical	Mechanisms of action of free radicals I
7	Theoretical	Mechanisms of action of free radicals II
8	Intermediate Exam	Oxidative Stress, Free Radicals and Antioxidant Defense Midterm Exam
9	Theoretical	Mechanisms of action of free radicals III
10	Theoretical	Effects of free radicals on proteins
11	Theoretical	Effects of free radicals on lipids
12	Theoretical	Effects of free radicals on DNA
13	Theoretical	Measurements of free radicals
14	Theoretical	Oxidative Stress
15	Theoretical	Antioxidant Defense
16	Final Exam	Oxidative Stress, Free Radicals and Antioxidant Defense Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	2	84
Midterm Examination	1	18	2	20
Final Examination	1	19	2	21
Total Workload (Hours)				125
[Total Workload (Hours) / 25*] = ECTS				5
*25 hour workload is accepted as 1 ECTS				



**Learning Outcomes**

1	To understand the effects of oxidative damage on lipids, DNA and proteins
2	Literature review and interpretation of free radicals
3	To learn the types of free radicals
4	To be able to understand and use conventional biochemical techniques used in the determination of free radicals
5	To understand the mechanisms of action of free radicals

**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	4	5	4	4
P3	5	5	5	4	5
P4	4	5	4	5	4
P5	5	4	5	5	5

