



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

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|--|---|---|----------------------|---|---|--------------------------------|---|------------|---|
| Course Title | | Enzyme Kinetics | | | | | | | |
| Course Code | | BYK604 | | Couse Level | | Third Cycle (Doctorate Degree) | | | |
| ECTS Credit | 5 | Workload | 125 (<i>Hours</i>) | Theory | 2 | Practice | 0 | Laboratory | 0 |
| Objectives of the Course | | To teach the structure, types, mechanisms of action and inhibition of enzymes that form the basis of life. Quantitative properties of enzyme working mechanisms are explained with numerical examples. | | | | | | | |
| Course Content | | Definition and history of enzymes, Substrate specificity regulation of enzymatic activity, allosteric enzymes, chemical kinetics, the Michaelis-Menten equation, kinetic data analysis, enzyme inhibition, factors affecting enzyme activity, two-substrate enzymatic reactions, cofactors and coenzymes, active site-catalytic region, determination and meaning of the Km, Vmax and kcat parameters, examples of applications of enzyme kinetics. | | | | | | | |
| Work Placement | | N/A | | | | | | | |
| Planned Learning Activities and Teaching Methods | | | | Explanation (Presentation), Discussion, Problem Solving | | | | | |
| Name of Lecturer(s) | | | | | | | | | |

Assessment Methods and Criteria

| Method | Quantity | Percentage (%) |
|---------------------|----------|----------------|
| Midterm Examination | 1 | 40 |
| Final Examination | 1 | 60 |

Recommended or Required Reading

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| 1 | Enzyme Kinetics Irwin H Segel John Wiley Sons, INC 1993 |
| 2 | Biochemical Calculations Irwin H. Segel John Wiley and sons Newyork,Toronto,Singapore,1982 |
| 3 | Harper's Biochemistry,R.K.Murray,D.K. Granner,P.A.Mayes,V.W.Rodwell. Middle east edition,2000 |
| 4 | Lehninger Principles of Biochemistry: International Edition, D.L. Nelson, M.M. Cox, 2017 |

| Week | Weekly Detailed Course Contents | |
|------|---------------------------------|---|
| 1 | Theoretical | Enzyme structures and working principles of enzymes |
| 2 | Theoretical | Enzyme types and functions of cofactors |
| 3 | Theoretical | Enzyme effect mechanisms and differences between enzymes and chemical catalysts |
| 4 | Theoretical | Flexible enzyme induced fit hypothesis |
| 5 | Theoretical | Factors responsible for catalytic yield of enzymes |
| 6 | Theoretical | Enzyme Kinetics |
| 7 | Theoretical | Enzymatic Activity, Michaelis Menten Equation |
| 8 | Intermediate Exam | Enzyme Kinetics Midterm |
| 9 | Theoretical | Importance and use of Km value |
| 10 | Theoretical | Lineweaver Burk diagram, determination of kinetic values |
| 11 | Theoretical | Reaction Sequences |
| 12 | Theoretical | Calculation of Km values ??using curves |
| 13 | Theoretical | Inhibitors, inhibition types and types of inhibitors |
| 14 | Theoretical | Multi-site and allosteric enzymes |
| 15 | Theoretical | Multi-substrate enzymes and their kinetic mechanisms |
| 16 | Final Exam | Enzyme Kinetics 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

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|---|--|
| 1 | To be able to understand enzyme structures and working principles of enzymes |
| 2 | To be able to identify and evaluate the factors affecting enzyme activity |
| 3 | To be able to determine the catalytic activity of enzymes |
| 4 | Learning enzyme kinetics |
| 5 | To be able to comprehend that enzyme kinetics is a quantitative concept |

Programme Outcomes (Biochemistry (Medical) Doctorate)

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|---|--|
| 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 | 5 | 5 | 4 | 5 | 4 |
| P3 | 4 | 4 | 5 | 5 | 5 |
| P4 | 5 | 5 | 4 | 4 | 4 |
| P5 | 4 | 4 | 5 | 5 | 5 |

