**Content**

| Course Code | Course Name | Semester | Theory | Practice | Lab | Credit | ECTS |
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| MAT371 | Selected Topics I | 5 | 3 | 0 | 0 | 3 | 5 |

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| Prerequisites | |
| Admission Requirements | |

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| Language of Instruction | French |
| Course Type | Elective |
| Course Level | Bachelor Degree |
| Objective | The objective of this course is to study selected topics from five fundamental theories of Applied Mathematics: optimization theory, fixed point theory, approximation theory, game theory, and social choice theory. |
| Content | Within the framework of this course, the selected topics will first be studied through the fundamental concepts and results of the corresponding theories. Their historical development will then be discussed, followed by a presentation of the necessary mathematical tools and prerequisites. Finally, the methods and concepts studied will be applied to problems arising in fields such as data science, economics, physics, and numerical analysis. |
| References | Introduction to Global Optimization , R. Horst , P. M.Pardolas &N. V. Thoai , Kluwer Academic Publishers ,<br><br>The Princeton Companion to Applied Mathematics , Edited by Nicholas J. Higham , Princeton University Press , 2015<br><br>https://nhigham.com/2016/03/29/the top 10 algorithms in applied mathematics<br><br>A gentle introduction to optimization / B. Guenin , J. Könemann , L. Tunçel Cambridge University Press<br><br>Introductory Functional Analysis with Applications, E. Kreyszig, Wiley<br>An Introduction to Real Analysis, T. Terzioğlu, ODTÜ<br>Fonksiyonel Analizin Yöntemleri, T. Terzioğlu, Matematik Vakfı<br>Fonksiyonel Analiz, E. Şuhubi, İTÜ Vakfı<br>Bir Analizcinin Defeterinden Seçtikleri, T.Terzioğlu, Nesin Matematik Köyü<br>Real Analysis with Economic Applications, Efe A. Ök, Princeton University Press<br>Numerical Optimization , J. Nocedal & S. J. Wright, Springer , 1999. ve 2. basım<br><br>Mutiagent Systems,<br>by Yoav Shoham & Kevin Leyton-Brown,<br>Cambridege, 2010<br><br>You can download from:<br>http://www.masfoundations.org/download.html |

**Theory Topics**

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