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| Department Department of Mathematics | | | Academic Year 2022-2023 | Date 01/12/2022 | |
| Course Unit Code MATH3108 | Course Unit Title Numerical Analysis and its Computer Applications II | | Semester/Year Spring / 3 | Number of ECTS Credits 6 | |
| Language of Instruction | Turkish | | | | |
| Type of Course Unit | Compulsory | | | | |
| Prerequisites and co-requisites | - | | | | |
| Address of course | - | | | | |
| Local Credit | Theoretical | Practical | Laboratory | Presentation | Project |
| 3 | 2 | 2 | - | - | - |
| Name of Lecturers | Professor Hasan BULUT | | | | |
| Assistants | - | | | | |

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| Course content | Numerical solutions of linear differential equation systems with partial differential Gauss elimination. Linear, second and third degree spline functions. Numerical solutions of ordinary differential equations, Taylor series, Euler and Runge-Kutta methods, Adams and Milne methods, Numerical solutions of differential equations systems and Mathematica codes and computer applications, Numerical solutions of partial differential equations, Finite difference solutions of elliptic, parabolic, hyperbolic equations Mathematica codes and computer applications, numerical solutions of boundary value problems. Data analysis with least squares method, Mathematica codes and computer applications |
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| Weekly Detailed Course Contents | |
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| Week | Topic |
| 1 | Numerical solutions of linear differential equation systems with partial differential Gauss elimination |
| 2 | Linear second and third degree spline functions |
| 3 | Numerical solutions of ordinary differential equations |
| 4 | Taylor series, Euler and Runge-Kutta methods |
| 5 | Adams and Milne methods |
| 6 | Mathematica codes and computer applications |
| 7 | Numerical solutions of differential equations systems |
| 8 | Mathematica codes and computer applications |
| 9 | General application |
| 10 | Numerical solutions of partial differential equations, elliptic, parabolic, hyperbolic |
| 11 | Mathematica codes and computer applications |
| 12 | Numerical solutions of boundary value problems |
| 13 | Data analysis with least squares method, Mathematica codes and computer applications |
| 14 | A brief evaluation of the course content and topics |

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| Course Resources | 1. Sayısal Analiz Yöntemleri(Eyüp Sabri TÜRKER) 2. Sayısal Analiz ve Mühendislik Uygulamaları(İrfan Karagöz) 3. Nümerik Analiz (Nuri Özalp) |
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| Assessment Methods and Criteria | In-Term studies | Quantity | Percentage (%) |
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| | Mid-Term Exams | 1 | 40 |
| | Quizzes | - | - |
| | Assignments | - | - |
| | Projects | - | - |
| | Term assignment | - | - |
| | Laboratory | - | - |
| | Other | - | - |

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| | Final exam | 1 | 60 |
| On Assessment Methods and Criteria | A grade of success; the relative evaluation system or the discretion of the instructor. In order to be taken into consideration in the courses in which the relative evaluation system and teaching staff's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the letter grades of the success grades are determined by the consent of the instructor teaching the table by 100 points by the Senate using the distribution of the final grade of success. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course | | |

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| Percentage of Course Category (%) | Mathematics and Basic Sciences | 80 |
| | Computer Sciences | 20 |
| | Programming Design | 0 |
| | Social sciences | 0 |

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| Course Outcome | Students have basic knowledge about “Numerical solutions of linear differential equation systems with partial differential Gauss elimination. Linear, second and third degree spline functions. Numerical solutions of ordinary differential equations, Taylor series, Euler and Runge-Kutta methods, Adams and Milne methods, Numerical solutions of differential equations systems and Mathematica codes and computer applications, Numerical solutions of partial differential equations, Finite difference solutions of elliptic, parabolic, hyperbolic equations Mathematica codes and computer applications, numerical solutions of boundary value problems. Data analysis with least squares method, Mathematica codes and computer applications” |
| Aims of the course | 1. Create the infrastructure of necessary information relation to Numerical Analysis and Computer Applications II. 2. Acquire the technical knowledge to be able to produce the most appropriate solution in Numerical Analysis and Computer Applications II and write and operate codes with computer program |
| The way of processing course | Face to face |

| Relation of the course with program outcomes | | | | |
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| Learning outcomes | | 1 | 2 | 3 |
| 1 | To have advanced theoretical and applied knowledge in a way to prioritize the scientific approach supported by textbooks containing up-to-date information in the field, application tools and other resources | | | |
| 2 | Adapting and transferring the knowledge gained in the field to secondary education | | | |
| 3 | Ability to independently carry out an advanced study in the field | | | |
| 4 | Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills. | | | X |
| 5 | Using a foreign language at least at the European Language Portfolio B1 General Level, following the information in the field and being able to communicate with colleagues | | | |
| 6 | To be able to use information and communication technologies together with computer software at minimum advanced level of European computer license required by the field. | | | |
| 7 | Have the ability to make oral and written presentation in native language | | | |
| 8 | Having the ability to understand spoken English and use English at reading level | | | |
| 9 | To have the ability to assimilate mathematical concepts and understand the relationships between them, to recognize different aspects of the same concepts and relationships | | X | |
| 10 | To have the ability to define and formulate the relationships between items in non-mathematical disciplines in the language of mathematics. | | | X |
| 11 | To have the ability to use mathematical knowledge in different problems | | | |
| 12 | Having the ability to develop computer programs using mathematical knowledge | | | |

Contribution of the course: 1:No 2:Partially 3:Completely

Preparer: Professor Hasan BULUT

Preparation date: 01/12/2022