|  |  |
| --- | --- |
|  | **HASAN KALYONCU UNIVERSITY**  **Faculty of Engineering**  **Course Description Form** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COURSE:** Calculus II | | | | |
| **CODE:** MATH112 | **SEMESTER:** SPRING | | | |
| **LANGUAGE:** ENGLISH | **TYPE:** COMPULSORY | | | |
| **PRE-REQUISITES:**-  **CO-REQUISITES:**- | **THEORY** | **PRACTICAL** | **CREDIT** | **ECTS** |
| **WEEKLY HOURS:4** | 4 | 0 | 4 | 6 |

|  |
| --- |
| **CONTENT OF THE COURSE:**  Antiderivatives, Area and estimating with finite sums, limits of finite sums, the definite integral. Fundamental theorem of calculus, indefinite integrals and substitution. Area between curves. Volumes using cross-sections, volumes using cylindrical shells. Inverse functions and their derivatives, natural logarithms, exponential functions. L’Hospital Rule, Integration by parts, trigonometric integrals, Improper integrals, Sequences, Infinite series, the integral test, Comparison tests, The ratio and root tests. Alternating series, Power series. Taylor and Maclaurin series, Convergence of Taylor series. |

|  |
| --- |
| **OBJECTIVE OF THE COURSE:**  To learn the concepts and methods of differential and integral calculus for functions of a real variable. To apply calculus to problems taken primarily from the physical and engineering sciences. The mathematical preparation for higher level mathematics and science courses. An understanding of the logical sequence of advanced mathematics. |

|  |  |
| --- | --- |
| **WEEKLY SCHEDULE** | |
| **Week** | **Topics** |
| 1 | Antiderivatives, Area and estimating with finite sums, limits of finite sums, the definite integral |
| 2 | Fundamental theorem of calculus, indefinite integrals and substitution |
| 3 | Area between curves. |
| 4 | Volumes using cross-sections, volumes using cylindrical shells. |
| 5 | Inverse functions and their derivatives, natural logarithms, exponential functions. |
| 6 | L’Hospital Rule, Inverse trigonometric functions |
| 7 | Integration by parts, trigonometric integrals |
| 8 | MIDTERM |
| 9 | Trigonometric substitutions, integration of rational functions by partial fractions |
| 10 | Improper integrals, Sequences |
| 11 | Infinite series, the integral test |
| 12 | Comparison tests, The ratio and root tests |
| 13 | Alternating series, absolute and conditional convergence, Power series |
| 14 | Taylor and Maclaurin series, Convergence of Taylor series |

|  |
| --- |
| **TEXTBOOK:**  Thomas, Weir, J. Hass, Thomas Calculus Early Transcendentals, 13’th Edition, Pearson, 2014, ISBN10 0321884078  **REFERENCE BOOKS:**R. Smith and R.Minton, Calculus, ISBN 978-0-07- 338311-8. |

|  |  |  |
| --- | --- | --- |
| **EVALUATION SYSTEM:** | | |
| **IN-TERM STUDIES** | **QUANTITY** | **PERCENTAGE (%)** |
| Midterm Exam | 1 | 40 |
| Homework | 0 | 0 |
| Labworks | 0 | 0 |
| Quiz | 0 | 0 |
| Final Exam | 1 | 60 |
| **TOTAL** |  |  |
| CONTRIBUTION OF INTERM STUDIES TO OVERALL GRADE | 1 | 40 |
| CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE | 1 | 60 |
| **TOTAL** |  | 100 |

|  |  |
| --- | --- |
| **COURSE CATEGORY:** | **PERCENTAGE (%)** |
| Mathematics and Basic Sciences | %60 |
| Engineering | %40 |
| Engineering Design | %0 |
| Social Sciences | %0 |

|  |  |  |  |
| --- | --- | --- | --- |
| **TABLE OF ECTS / WORKLOAD:** | | | |
| **Activities** | **QUANTITY** | **Duration**  **(Hour)** | **Total**  **Workload** |
| Course Duration | 13 | 4 | 52 |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 7 | 98 |
| Mid-term | 1 | 2 | 2 |
| Final examination | 1 | 2 | 2 |
| Labworks | 0 | 0 | 0 |
| Quiz | 0 | 0 | 0 |
| **Total Work Load** |  |  | **154** |
| **Total Work Load / 30** |  |  | **5,1** |
| **ECTS Credit of the Course** |  |  | **6** |

|  |  |
| --- | --- |
| **INSTRUCTOR(S):** | Assoc. Prof. Dr. Ece Yetkin ÇELİKEL |
| **FORM PREPARATION DATE:** | 25.11.2019 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** |
| **LO1** | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **LO2** | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **LO3** | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **LO4** | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **LO5** | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | PO: Program Outcomes | LO: Learning Outcomes  Values: 0: None | 1: Low | 2: Medium | 3: High | | | | | | | | | | |

|  |  |
| --- | --- |
| **LEARNING OUTCOMES OF THE COURSE:** | **PROGRAM OUTCOMES:** |
| **LO1:** A comprehension of mathematics (algebra, differential, integration …) and fundamentals of science**LO2:**Ability to apply knowledge of mathematics, science and engineering to problems in electronics engineering. **LO3:**Ability to recognize the needs and challenges of our age and to assess the global and social impact of engineering solutions  **LO4:** Ability to identify, formulate and solve engineering problems.  **LO5:** Ability to effectively communicate knowledge and opinions via written, oral visual means. | **PO1:** Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.  **PO2:** Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.  **PO3:** Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.  **PO4:** Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.  **PO5:** Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.  **PO6:** Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.  **PO7:** Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.  **PO8:** Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.  **PO9:** Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.  **PO10:** Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.  **PO11:** Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions. |