| | SPECIAL FUN | ΙΟΤΙΟ | NS ON MATHEMATICS | | | | | |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 1 | Course Title: | SPECIA | L FUNCTIONS ON MATHEMATICS | | | | | |
| 2 | Course Code: | MAT304 | 3 | | | | | |
| 3 | Type of Course: | Optional | | | | | | |
| 4 | Level of Course: | First Cyc | sle | | | | | |
| 5 | Year of Study: | 3 | | | | | | |
| 6 | Semester: | 5 | | | | | | |
| 7 | ECTS Credits Allocated: | 5.00 | | | | | | |
| 8 | Theoretical (hour/week): | 3.00 | | | | | | |
| 9 | Practice (hour/week): | 0.00 | | | | | | |
| 10 | Laboratory (hour/week): | 0 | | | | | | |
| 11 | Prerequisites: | Have tak Different | en the courses of Differential Equations I, II, Partial ial Equations and Analysis III, IV and get passed grade | | | | | |
| 12 | Language: | Turkish | | | | | | |
| 13 | Mode of Delivery: | Face to f | face | | | | | |
| 14 | Course Coordinator: | Prof. Dr. | EMRULLAH YAŞAR | | | | | |
| 15 | Course Lecturers: | | | | | | | |
| 16 | Contact information of the Course Coordinator: | Prof.Dr. Emrullah Yaşar e-mail:eyasar@uludag.edu.tr;emrullah.yasar@gmail.com | | | | | | |
| 17 | Website: | | | | | | | |
| 18 | Objective of the Course: | To construct the necessary background for students of the mathematics department to examine and analyze mathematical models emerging in other disciplines. | | | | | | |
| 19 | Contribution of the Course to Professional Development: | Gains the background to follow the new developments in the field of mathematics. | | | | | | |
| 20 | Learning Outcomes: | | | | | | | |
| | | 1 | Learns the necessary methods to examine the mathematical models encountered in applied science. | | | | | |
| | | 2 | Using this knowledge, it provides a mathematical approach to interdisciplinary issues. | | | | | |
| | | 3 | Can interprate the application of derivative and integration | | | | | |
| | | 4 | Can interprate the application of area and volume | | | | | |
| | | 5 | Apply the Taylor and Fourier series to other areas. | | | | | |
| | | 6 | understand the Gamma and beta ve error functions | | | | | |
| | | 7 | Makes calculations on line integrals, Stokes theorem and tensor calculus. | | | | | |
| | | 8 | Knows some basic notations on complex calculus. | | | | | |
| | | 9 | can solve the partial differential equations. | | | | | |
| | | 10 | Can describe population dynamics, chaos and bifurcation. | | | | | |
| 21 | Course Content: | | | | | | | |
| | | Co | ourse Content: | | | | | |
| Week | Theoretical | | Practice | | | | | |
| 1 | Vectors, Linear Independence, Scal Vector Product, Triple Scalar Product Vector Product, Levi-Civita Tensor, and Vector Fields, Gradient, Diverge Rotational, Laplacian | ar and ct, Triple Scalar ence, | | | | | | |

| 2 | Derivative and its applications, integr applications | al and | | | | | | | | | |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------|--------|-----------------|---------------------------|--|--|--|--|--|
| | Length, area and volume elements in derivative, chain, cartesian, spherical cylindrical coordinate systems, | n I and | | | | | | | | | |
| 3 | Area and volume applications, Dirac function. | delta | | | | | | | | | |
| 4 | İnfinite sequences | | | | | | | | | | |
| | Taylor and Fourier sequences | | | | | | | | | | |
| 5 | Gamma, beta and error functions | | | | | | | | | | |
| 6 | Vector analysis, | | | | | | | | | | |
| 7 | Laplacian, line integral, Stokes theory analysis, metric tensor, numerical ter | y, tensor nsor. | | | | | | | | | |
| 8 | Complex function theory: Complex arithmetic, imaginary numb complex functions, finding residues, conformal mapping. | ers, | | | | | | | | | |
| 9 | Partial differential equations | | | | | | | | | | |
| | Laplace equation and its applications cartesian, spherical and cylindrical sy | s in /stems | | | | | | | | | |
| 10 | Heat conduction equation, quantum hoscillator, vibrating membrane. | narmonic | | | | | | | | | |
| 11 | Integral transformations | | | | | | | | | | |
| Activites | | | | Number | Duration (hour) | Total Work Load (hour) | | | | | |
| Theore | ical | otio | | 14 | 3.00 | 42.00 | | | | | |
| Practic | als/Labs | SIIC | | 0 | 0.00 | 0.00 | | | | | |
| Se li 3sti | Board the person of the second s | rcation. | | 14 | 2.00 | 28.00 | | | | | |
| Homev | vorks | | | 14 | 2.00 | 28.00 | | | | | |
| Project | Rnown District and Continous probat | olity | | 0 | 0.00 | 0.00 | | | | | |
| Field S | tudies | | | 0 | 0.00 | 0.00 | | | | | |
| Midterr | n exams | | | 1 | 5.00 | 5.00 | | | | | |
| Others | | | | 6 | 7.00 | 42.00 | | | | | |
| Final E | xams | | e | dition | 5.00 | 5.00 | | | | | |
| Total V | Vork Load | | | | | 150.00 | | | | | |
| Total w | ork load/ 30 hr | | | | | 5.00 | | | | | |
| ECTS | Credit of the Course | | | | | 5.00 | | | | | |
| | _ | R | | | | | | | | | |
| Midterm Exam | | | | 40.00 | | | | | | | |
| Quiz 0 | | | | 0.00 | | | | | | | |
| Home work-project 0 | | | | | | | | | | | |
| Final E | xam | 1 | 60.00 | | | | | | | | |
| Total | | 2 | 10 | 100.00 | | | | | | | |
| Succes | oution of Term (Year) Learning Activitie | es to | 40 | 40.00 | | | | | | | |
| 040000 | Solute | | | | | | | | | | |
| Contrib | pution of Final Exam to Success Grade | 9 | 60 | 0.00 | | | | | | | |

| Measurement and Evaluation Techniques Used in the | Measurement and evaluation are performed according to |
|---------------------------------------------------|-------------------------------------------------------|
| Course | the Rules & Regulations of Bursa Uludağ University on |
| | Undergraduate Education. |

24 ECTS / WORK LOAD TABLE

| 25 | CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS | | | | | | | | | | | | | | | |
|----------------------------------------------------|------------------------------------------------------------------|-----|-----|-------|-----|----------|-----|-----|--------|----------|------|-------------|----------|------|------|------|
| | PQ1 | PQ2 | PQ3 | PQ4 | PQ5 | PQ6 | PQ7 | PQ8 | PQ9 | PQ1 0 | PQ11 | PQ12 | PQ1 3 | PQ14 | PQ15 | PQ16 |
| ÖK1 | 4 | 5 | 3 | 4 | 3 | 4 | 5 | 4 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK2 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 4 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK4 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK6 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK7 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK8 | 4 | 4 | 3 | 3 | 0 | 2 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK9 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK10 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| LO: Learning Objectives PQ: Program Qualifications | | | | | | | | | | | | | | | | |
| Contrib ution Level: | ntrib 1 very low 2 lo on vel: | | | 2 Iow | | 3 Medium | | | 4 High | | | 5 Very High | | | | |