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|---|------------|----------------------------------|---------------|-----------------|
| <b>Obuda University</b><br>John von Neumann Faculty of Informatics  |            | Institute of Applied Mathematics |               |                 |
| <b>Name and Code:</b> <i>Calculus II. NMXAN2EBNE</i>  |            | <b>Credits:</b> 6                |               |                 |
| <i>BSc in Computer Science and Engineering</i>  |            | <i>2019/20 year II.semester</i>  |               |                 |
| Subject lecturer: István Vajda  |            |                                  |               |                 |
| Prerequisites<br>(with code):   |            | Calculus I. NMXAN1EBNE           |               |                 |
| Weekly hours:   | Lecture: 3 | Seminar: 3                       | Lab. hours: 0 | Consultation: 0 |
| Way of<br>assessment:   | Exam       |                                  |               |                 |
| <b>Course description</b>   |            |                                  |               |                 |
| <i>Goal:</i> Students have to understand the basic notions of calculus and acquire the necessary knowledge and skills to solve problems related to computer science and engineering. The course material corresponds with the international trends of instructions. |            |                                  |               |                 |
| <i>Course description:</i> Integral calculus and its application. Improper integrals. Ordinary differential equations. Laplace-transform. Series of numbers. Series of functions: Taylor series, Fourier series. Functions of several variable.                     |            |                                  |               |                 |

| <b>Lecture schedule</b> |   |
|-------------------------|---|
| Education week          | Topic   |
| 1.                      | Integration of elementary functions.  |
| 2.                      | Applications of integrals in geometry: Area, volume, arc length, surface area of solid of revolution. |
| 3.                      | Applications of integral in physics: work, centre of gravity.   |
| 4.                      | Numerical integration. Improper integrals.  |
| 5.                      | Laplace transform.  |
| 6.                      | Differential equations (basic notions). Separable differential equations.                             |
| 7.                      | First order linear differential equations.  |
| 8.                      | Second order linear differential equations.   |
| 9.                      | Series of numbers.  |
| 10.                     | Series of functions. Taylor series.   |
| 11.                     | Fourier series.   |
| 12.                     | Functions of several variables, partial derivative, total derivative.                                 |
| 13.                     | Integration of functions of several variables.  |
| 14.                     | Extrema of functions of several variables.  |

| Midterm requirements  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
|---|---|--------|-----------|------|----------|-------|----------|-------|------------------|-------|----------|--------|---------------|
| Signature requirements  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| <p>Students have to attend the lessons regularly. If the missed lessons go beyond 30% of the total, then they become 'rejected', that is they failed the subject.</p> <p>Students are required to write two mid-term tests and the sum of their results must be at least 50% of the total 100 points. Students have an opportunity to retake a missing or the weaker mid-term test during the last week of the semester. Someone without two written test becomes 'rejected' at the end of the terms.</p> <p>The mid-term tests comprise practical exercises, as well as theoretical questions. Theoretical questions are from the material covered at lectures and seminars.</p> <p>In addition students have to solve some compulsory self-checking test in the Moodle-system.</p> <p>Students get a signature, if all of the above requirements are fulfilled.</p> |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Midterm papers  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Education week  | Topic   |        |           |      |          |       |          |       |                  |       |          |        |               |
| 6.  | Integral calculus, Laplace transform, differential equations.   |        |           |      |          |       |          |       |                  |       |          |        |               |
| 13.   | Differential equations, series, functions of several variables. |        |           |      |          |       |          |       |                  |       |          |        |               |
| 14.   | Retake one of the tests.  |        |           |      |          |       |          |       |                  |       |          |        |               |
| Signature retake exam   |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| <p>If a student has written both mid-term tests, but their overall result is under 50%, and their absence at seminars does not exceed 30% of the total number of lessons, they have one opportunity to write a paper covering the whole course material in the exam-period. The test contains simple questions and students need to achieve at least 60% of the scores for the end-term signature.</p> <p>Please note, that if you don't write both of your tests, then you will not have this opportunity!</p>   |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Type of exam  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| <p>Students possessing the end-term signature can take the end-term exam. The type of exam is written. The exam paper contains theoretic and practical questions as well. To pass the exam students have to achieve at least 50% from each the theoretic and practical part.</p>  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Exam mark   |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| <p>Students receive an exam mark based on their results on mid-term tests and the exam according to the following chart:</p> <table border="1"> <thead> <tr> <th>Points</th><th>Exam mark</th></tr> </thead> <tbody> <tr> <td>0-49</td><td>fail (1)</td></tr> <tr> <td>50-61</td><td>pass (2)</td></tr> <tr> <td>62-73</td><td>satisfactory (3)</td></tr> <tr> <td>74-85</td><td>good (4)</td></tr> <tr> <td>86-100</td><td>excellent (5)</td></tr> </tbody> </table> <p>The achieved points come from the midterm tests (at most 30 points), the theoretic part of the exam (at most 30 points) and the practical (at most 40 points).</p>   |   | Points | Exam mark | 0-49 | fail (1) | 50-61 | pass (2) | 62-73 | satisfactory (3) | 74-85 | good (4) | 86-100 | excellent (5) |
| Points  | Exam mark   |        |           |      |          |       |          |       |                  |       |          |        |               |
| 0-49  | fail (1)  |        |           |      |          |       |          |       |                  |       |          |        |               |
| 50-61   | pass (2)  |        |           |      |          |       |          |       |                  |       |          |        |               |
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| 74-85   | good (4)  |        |           |      |          |       |          |       |                  |       |          |        |               |
| 86-100  | excellent (5)   |        |           |      |          |       |          |       |                  |       |          |        |               |
| References  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Mandatory:  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| M. Oberguggenberger, A. Ostermann.: Analysis for Computer Scientists. In: Undergraduate Topics in Computer Science. Springer-Verlag Ltd. London, 2011   |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| Recommended:  |   |        |           |      |          |       |          |       |                  |       |          |        |               |
| <a href="http://elearning.uni-obuda.hu/">http://elearning.uni-obuda.hu/</a>   |   |        |           |      |          |       |          |       |                  |       |          |        |               |