Week: April 27 – May 3, 2020
Topic: **Applications and integral theorems**

The below provided instructions should guide you through studying the topic. For additional explanation, clarification and extra material contact the Lecture/Tutorial teacher by email or the MS-Teams platform for live online consultation (see webpage for the link).
https://mat.nipax.cz/mathematics:mathematics_ii

In the first lecture we will review the possible applications of surface integrals (of both types) with focus on mechanics of fluids and solids. The theorems of Stokes and Gauss will be discussed in detail. The second lecture will focus on practical use of the integral theorems, including their role in studying potential and solenoidal fields. The differential operators *div* and *curl* will be revisited and redefined using the integral theorems.

1) Read and learn the explanation from the textbook. Scanned pages can be found on the web page.
https://mat.nipax.cz/_media/mathematics:pages_84-103.pdf
https://mat.nipax.cz/_media/mathematics:pages_104-118.pdf

Additional material and alternative explanation with many figures and exercises can be found in (free) online available textbooks
http://www.math.wisc.edu/~keisler/calc.html
namely chapter 13 http://www.math.wisc.edu/~keisler/chapter_13.pdf

https://openstax.org/books/calculus-volume-3/pages/1-introduction
namely chapter 6.7 - 6.8 https://openstax.org/books/calculus-volume-3/pages/6-7-stokes-theorem
https://openstax.org/books/calculus-volume-3/pages/6-8-the-divergence-theorem

2) Take a look at the solved exercises from our collection of examples
questions: https://mat.nipax.cz/_media/surface_integral.pdf
complete solutions (in Czech): https://mat.nipax.cz/_media/19plosny-skalar.pdf
https://mat.nipax.cz/_media/plosny_integral_vektor_pole.pdf
https://mat.nipax.cz/_media/veta_gauss_ostrogradsky.pdf

3) As a training solve (at least) the following exercises.
624, 628, 632 – applications of surface integral
682, 686, 699 – Gauss divergence theorem

4) As a long term **homework, to be delivered at your return to the school (at latest at the end of semester, prior getting the assessment from tutorials)**, solve all the Gauss (divergence) theorem and potential field in E_3 exercises from sample exams from our webpage
https://mat.nipax.cz/_media/mathematics:ma2_exam_1_en.pdf
https://mat.nipax.cz/_media/mathematics:ma2_exam_2_en.pdf
https://mat.nipax.cz/_media/mathematics:ma2_exam_3_en.pdf

The delivery of all sample exams (completely and correctly solved) is necessary condition for obtaining the assessment from tutorials.

If you have some part of the homework done, ready to be checked and corrected by us, please scan it to PDF and send it to us by email.
Don't wait and leave it at the end of semester!