



COMPUTER-AIDED WELL LOG ANALYSIS

MS in Petroleum Geoengineering

Semester 1, 2018/19

COURSE COMMUNICATION FOLDER

**University of Miskolc
Faculty of Earth Science and Engineering
Institute of Geophysics and Geoinformatics**

Course datasheet

Course Title: Computer-aided well log analysis (Optional Courses)	Credits: 4
Type (lec. / sem. / lab. / consult.) and Number of Contact Hours per Week: sem. 2	
Neptun code: MFGFT73012	
<p>Type of Assessment (exam. / pr. mark. / other): pr. mark Conditions for obtaining the signature: the presence in at least 70 % of the lessons and the successful solutions of two problems in the classroom by using a computer and the necessary software. The determination of the practical mark is based on the evaluations of two problem solutions. The weights of the partial achievements are the same: 50% + 50%. Grading scale (% value → grade): 0 – 49 % → 1 (fail), 50 – 64 % → 2 (pass), 65 – 79 % → 3 (satisfactory), 80 – 89 % → 4 (good), 90 – 100 % → 5 (excellent).</p>	
Position in Curriculum (which semester): third	
Pre-requisites (<i>if any</i>): Petrophysics - Well log interpretation (MFGFT720017)	
Course Description:	
<p>Acquired store of learning: <u>Study goals:</u> Introduction to the computer-aided management, visualization, processing and analysis of data coming from well logging operations applied in hydrocarbon exploration. <u>Course content:</u> Essential characteristics of the file formats and data structures applied in well logging. The user interface of MATLAB environment. Data import from ASCII coded files, visualization of data sets, simple operations used in data processing and analysis by means of MATLAB. Basics of the Techlog user interface. Creating and managing projects in Techlog. Data import and quality control. Management of the variables. Computation of True Vertical Depth (TVD). Interactive display of data in tables, charts, cross-plots and log views. Application of interactive selection mode. Creation, management and use of zones and markers. Depth shifting and splicing of log curves. Introduction to the workflow of deterministic well log evaluation in Techlog (the Application Workflow Interface). Quick Look Log Analysis. Conventional Log Analysis. The Python module of the Techlog environment. Python basics.</p> <p>Competencies to evolve: T1, T5, T10, K1, K2, K7, K10, A1, A5, A8, A9, F3, F4, F5.</p>	
The 3-5 most important compulsory, or recommended literature (textbook, book) resources:	
<ul style="list-style-type: none"> • Andrew Knight, 2000: Basics of MATLAB and Beyond, CHAPMAN & HALL/CRC Boca Raton London New York Washington, D.C. • Martin H. Trauth, 2006 : MATLAB® Recipes for Earth Sciences, © Springer-Verlag Berlin Heidelberg, Printed in The Netherlands • Hans Petter Langtangen 2004: Python Scripting for Computational Science Third Edition, Springer-Verlag Berlin Heidelberg • William R. Green, 1991 : Exploration with a Computer Geoscience Data Analysis Applications, Pergamon Press, ISBN 0-08-040264-X • Toby Darling, 2005: Well Logging and Formation Evaluation, Gulf Professional Publishing is an imprint of Elsevier 30 Corporate Drive, Suite 400, Burlington, MA 01803, USA Linacre House, Jordan Hill, Oxford OX2 8DP, UK 	
Responsible Instructor (<i>name, position, scientific degree</i>):	
Péter Tamás Vass Dr., associate professor	

Syllabus of the semester

Week	Seminar
12/09/2018	Basics of the Techlog user interface. Creating and managing projects in Techlog.
26/09/2018	Data import and quality control.
03/10/2018	Management of the variables. Computation of True Vertical Depth (TVD).
10/10/2018	Interactive display of data in tables, charts, cross-plots and log views.
17/10/2018	The solution of the first problem by using a computer and the necessary software.
24/10/2018	Application of interactive selection mode. Creation, management and use of zones and markers.
07/11/2018	Depth shifting and splicing of log curves.
14/11/2018	Introduction to the workflow of deterministic well log evaluation in Techlog (the Application Workflow Interface).
21/11/2018	Quick Look Log Analysis
28/11/2018	Conventional Log Analysis.
05/12/20108	The Python module of Techlog environment. Python basics.
12/12/2018	The solution of the second problem by using a computer and the necessary software.

Example of problem to be solved

1. Start Techlog, and create a new project. (3 points)
2. Import the *xxx.las* file into the project. (3 points)
3. Select the right family and unit for each imported variables. (3 points)
4. Create a logview with three tracks, and display the variables in the form of log curves, then save it. (4 points)
5. Create a histogram from the data of gamma ray and save it. (3 points)
6. Create a neutron-density crossplot, and add a color scale adjusted to the gamma ray values to it, then save it. (4 points)

The following aids can be used during the solution of problem:

- a computer with installed Techlog,
- electronic help of Techlog,
- slides of the course provided by the lecturer,
- own exercise book with the notes made in the former lessons.

Time available for the solution: 50 min.

Evaluation of the solution

Maximum points: 20

Acquired points:

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Range	Mark
$0 \leq \text{and} < 10$	1
$10 \leq \text{and} < 13$	2
$13 \leq \text{and} < 16$	3
$16 \leq \text{and} < 18$	4
$18 \leq \text{and} \leq 20$	5

Mark: