Hochschule München University of Applied Sciences

# Courses in English
## Course Description

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| **Department** | 09 Engineering and Management |
| **Course title** | **Mathematics - Basic Concepts and Applications** |
| **Course number** | |
| **Hours per week (SWS)** | 6 |
| **Number of ECTS credits** | 5 |
| **Course objective** | Competence Level 1 “Review”:<br>• Students recall mathematical laws, principles of mathematical reasoning and properties.<br>• Students can distinguish vectors from scalar quantities.<br>• Students know the basic laws of linear algebra.<br>Competence Level 2 “Understand”:<br>• Students understand the basics principle of engineering computation.<br>Competence Level 3 “Apply”:<br>• Students can solve mathematical equations in all types of functions discussed in the lectures.<br>• Students can differentiate and integrate all types of functions discussed in the lectures for both one- and multi dimensional functions.<br>• Students apply vector calculus.<br>• Students apply operations of linear algebra.<br>• Students can solve nonlinear equations by iterative numerical methods.<br>• Students can implement differential and integral calculus on a computer.<br>• Students are capable of processing numerical fitting procedures.<br>Competence Level 4 “Analyse”:<br>• Students can mathematize technological problems and solve the mathematical problems deduced from these.<br>• Students discuss applications of the mathematical methods presented in the course. |
| **Prerequisites** | Technical secondary school mathematics |
| **Recommended reading** | POTTER, Merle C., LESSING, Jack. L, ABOUFADEL Edward F, 2023: Mathematical Methods for Engineering and Science, 2nd edition Springer Cham, ISBN: 978-3-031-26150-3<br>GLYN, James, 2015. Modern engineering mathematics. 5th edition. Pearson. ISBN: 978-1292080734<br>CROFT, Anthony, 2015. Mathematics for Engineers. 4th. edition. Pearson/Prentice Hall. ISBN 978-1292077765 |
| **Teaching methods** | Seminars, self-study, revision |
| **Assessment methods** | Written exam<br>Duration: 90 minutes |
| **Language of instruction** | English |
| **Name of lecturer** | Prof. Dr. rer. nat. Alexander Herzog |
| **Email** | alexander.herzog@hm.edu |
| **Link** | |
| **Course content** | • Geometry and linear algebra<br>• Univariate and multivariate functions<br>• Differential calculus for univariate and multivariate functions<br>• Integral calculus for univariate and multivariate functions |

**Remarks**