

Course	Advanced Database Programming, 3 ECTS credits
Year and period	M.Sc. 1-2, 15-19 July 2019
Teacher(s)	Bernhard Thalheim, Professor, Christian-Albrechts-University Kiel, Germany
Person(s) in Charge	Ajantha Dahanayake, Professor, LUT University
Aims	<p>The aim of the course is to introduce students to database administration and programming with a focus on creating, querying, and managing the database management system.</p> <p>The participants will gain both theoretical competencies and practical skills – from relational databases and advanced SQL programming to the creation of databases and the administration of a database similar to organisational database administration.</p> <p>The course will also allow experiencing the application of exemplary VisualSQL tools and the PostgreSQL database management system.</p>
Content	<p>Lectures, tutorials, exercises and team project sessions will offer a comprehensive overview of the aims and scopes of Advanced Database Programming, introducing the students theoretical and practical aspects in:</p> <ul style="list-style-type: none"> - Data structure development for SQL applications based on object-relational features. - Database querying with SQL, database programming. - Database tuning and performance management for SQL applications. - Architectures for database application development including view techniques. - VisualSQL as a query development tool. - OLAP and other applications. <p>The course is also suitable for doctoral studies.</p>
Modes of Study	<ul style="list-style-type: none"> - Introductory lectures and exercises 24 hours - Team work and a limited project 20 hours - Presentations on the results of the team/project work 8 hours - Independent work, reading 26 hours <p>Total workload 78 hours</p>

	<p>The course will consist of lectures, tutorials and team work:</p> <ul style="list-style-type: none"> - The lectures, typically in the morning, will provide general knowledge on the concepts and technology; the techniques, views and approaches employed during the course will enable students to assimilate a structured approach to database creation and programming. - Tutorials will introduce practical examples of specific tools and techniques suitable for database creation and further programming. Students will work with the visual SQL tool and then further with PostgreSQL databases. Students will be issued detailed assignments. <p>The afternoon sessions will be dedicated to teamwork on a practical project with the Postgres database. The teams will be multidisciplinary, and students will experience the complex dynamics of database administration and engineering. An ex-post plenary session will wrap up the main lessons learned in the teamwork.</p>
Evaluation	<p>Final grade 0-5:</p> <ul style="list-style-type: none"> - Attendance 20% - Active participation in teamwork 30% - Presentation of project outcomes (assignment) 50%
Study Materials	<p>Handouts of lecture notes, open-access internet resources; selection of papers. Material on Postgres DB and Visual SQL; PostgreSQL (installed by students in their local environment).</p>
Prerequisites	<p>Preferably students with a Bachelor's degree or M.Sc. degree in technical studies and major studies in engineering. Database management system knowledge, experience in programming, basic knowledge of SQL, good knowledge of relational database technology.</p>