

<b>CT4850</b>	<b>Road paving materials</b>	<b>4</b>
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<b>Education Period</b>	1st Education Period	
<b>Exam Period</b>	1st Exam Period	
<b>Course Language</b>	English	
<b>Course Contents</b>	<p>Stresses and deformations in pavement structures. Characterisation of various road building materials, such as clay, laterite, sand, stabilised soils, base materials, concrete, (modified) bitumen and bituminous mixtures. Mechanical behaviour of these materials as a function of the external conditions (stress levels, loading time, temperature, moisture), the performance based design of mixtures, tests, specifications, recycling and environmental aspects. Measures and materials for road maintenance.</p> <ul style="list-style-type: none"> <li>- Qualitative insight into stresses and deformations in road pavements and into the various damage types (such as cracking/fatigue, rutting and ravelling);</li> <li>- Clay, laterite and sand: grain size distribution, classification, tests (CBR-test, triaxial test), effect of moisture content and compaction, principles of swell/shrinkage and suction, mechanical behaviour (failure, stress-dependent resilient and permanent deformation behaviour);</li> <li>- Soil stabilisation: principles, application of binders (lime, cement, bitumen), construction techniques, variation of material properties;</li> <li>- Base materials: overview of materials (including industrial waste products and recycled materials) with environmental aspects, mechanical behaviour (failure, stress-dependent resilient and permanent deformation behaviour);</li> <li>- Concrete: types of cement with their properties, admixtures, mix design, use of secondary materials, factors influencing the behaviour, tests, special concrete types (such as porous concrete and high strength concrete), shrinkage and high temperature stresses especially within 'fresh' concrete;</li> <li>- Bitumen: origin, production, rheological characterisation and mechanical behaviour, aging, specifications, fit-to-purpose modifications;</li> <li>- Bituminous mixtures: raw materials and mix composition, type of mixes related to behaviour, aggregate skeleton, performance based mix design (B15, SHRP, France), interaction bitumen/aggregate, bond, materials for maintenance, fatigue behaviour and dissipated energy, permanent deformation, durability, practical behaviour and test methods, specifications, special mixes (such as mixes impermeable for fluids, mixes for bridge decks and dikes);</li> <li>- Maintenance measures such as milling, overlays and repair of cracks and ruts.</li> </ul>	
<b>Study Goals</b>	Gaining insight into the effects of both internal factors (such as grading, composition and degree of compaction) and external factors (stress levels, loading time, temperature) on the structural behaviour of road materials in a pavement structure.	
<b>Education Method</b>	Lectures	
<b>Course Relations</b>	CT4850 uses CT3041 CT4850 uses CT3711	
<b>Literature and Study Materials</b>	Road Materials Parts I, II and III (Section Road and Railway Engineering). Available at the section secretariat. Road Building Materials (Section Materials Science) Available at BookShop Civil Engineering.	
<b>Assessment</b>	Oral exam	