Mittuniversitetet
MID SWEDEN UNIVERSITY

Course Syllabus:

Elektronics MA, Machine Vision Systems, 6 Credits

General data

Code	EL012A
Subject/Main field	Electronics
Cycle	Second cycle
Credits	6.00
Progressive specialisation	Second cycle, has only first-cycle course/s as entry requirements
Answerable department	Faculty of Science, Technology and Media
Established	2010-06-10
Date of change	2015-03-04
Version valid from	2013-08-15

Aim

The objective is to provide the students with an overview of machine vision systems, their applications, algorithms and modeling.

Course of objectives

After completion of the course the student shall be able to:
- Select a machine vision based optical measurement method for acquisition of 2D or 3D objects.
- Select illumination from standard components for a selected machine vision based measurement method.
- Describe the optics required for a given problem and chosen measurement method.
- Select a camera from a given problem description.
- Design and model functions for image processing and analysis of selected objects. These functions can consist of: pre-processing, frequency analysis, segmentation, morphology, labeling and analysis of objects.

Content

1. Introduction
2. Camera technology, systems for machine vision and digital imaging
3. Models for illumination (Diffused, directed, structured, and polarized light)
4. Optics
5. 2D measurement methods
6. 3D measurement methods
7. Image analysis (image enhancement, frequency analysis, segmentation, morphology and object analysis)
8. Image analysis in real-time

Entry requirements

Electrical Engineering 60, Credits (60 ECTS), including digital electronics and programming in C/C++ or Java.

Selection rules and procedures

The selectionprocess is in accordance with the Higher Education Ordinance and the local order of admission.

Teaching form

Lectures, seminars and laborations.

Examination form

Course modules,

4 hp Practical work
2 hp Theory

The theoretical part is examined using written exams. The practical work is examined with written reports.

The grading scale for the course/modules is A,B,C,D,E (pass levels), Fx and F (fail levels).

Grading system

The grades A, B, C, D, E, Fx and F are given on the course. On this scale the grades A through E represent pass levels, whereas Fx and F represent fail levels.

Course reading

Required literature

Carsten Steger, Markus Ulrich, Christian Wiedermann, Machine Vision Algorithms and Applications, Wiley-VCH, 978-3-527-40734-7