

Name of Module: Visual Computing		Credit Points (according to ECTS): 6	code designation MINF-KT-VC.S08
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Module Description			

1. Qualification Aims

- Upto date knowledge in Computer Vision and Image Processing techniques.
- Current research trends in CV and its applications to both HCI and new media content creation.
- Skills in vision based system development and design
- Knowing camera- and sensor-based interaction and design.
- Understanding of factors affecting imaging
- Working in teams and making effective presentations of ideas and concepts and bring them to completion in projects.

The course is **principally** designed to impart
technical skills 40% method skills 40% system skills 10% social skills 10%

2. Content

SE „Visual Computing“

The course covers recent trends in computational vision including various dimensions of imaging: geometry, photometry, and the environment. This includes theory of single and non-single viewpoint imaging geometry, calibration, design of general imaging and projection systems. We also study radiometry in terms of radiometric calibration, dynamic range of imaging as well as appearance changes due to weather effects like fog, mist, rain and physics based models thereof.

P „Vision-based Interaction“

The last few years have seen a variety of new and exciting avenues for applying computer vision research. In this course I would like to explore some newly emerged fields such as catadioptric systems (lens and mirror based optics) on the sensor level as well as higher level applications to Human Computer Interaction and Image based Recognition.

The course will be structured in a series of lectures introducing basic concepts and theories, while the students will be given the choice of working together on projects requiring collaborative efforts and system building. A Final presentation of the project work should be presented at the end of the course

3. Module Components

Course Name	Course type	Weekly hours per semester	CPs (according to ECTS)	Compulsory(C) / Compulsory Elective (CE)	Semester (WS / SS)
Visual Computing	SE	2	3	P	WiSe
Vision-based Interaction	P	2	3	P	WiSe / SoSe

4. Description of Teaching and Learning Methods

Lecture part: Lectures with in-class presentation exercises.
Exercise part: Project work related to various research directions.

5. Prerequisites for Participation

Mandatory: Knowledge of mathematics and geometry, and computer science.

Desirable: Understanding and aptitude for image processing techniques. Basic programming skills in Matlab, Java or C++.

6. Target Group of Module

- Diploma Study Course Computer Science ("Informatik"): Study domain „Technical-scientific applications“ (Studiengebiet "Technisch-wissenschaftliche Anwendungen")
- Diploma Study Course Computer Engineering ("Technische Informatik"): Main study period (Hauptstudium), course catalogue 1 „Technical Applications“ (Fächerkatalog 1, "Technische Anwendungen")
- Bachelor Computer Engineering ("Technische Informatik"): Specialized studies „Computer Engineering“ (Fachstudium "Technische Informatik")
- Bachelor Computer Science („Informatik“): Specialized studies "Computer Science", course specialisation "Communication Technology" (Fachstudium "Informatik", Studienschwerpunkt "Kommunikationstechnik")

7. Work Requirements and Credit Points

Course Type	Calculation Factor	Hours
Presence plenary meetings und talks	7*2	14
Pre- and post-processing	6*1	6
Reading		20
Literature research		10
Concept		6
Written preparation		30
Talk practice		4
Talk preparation		10
	Sum	100

8. Module Examination and Grading Procedures

The cumulative grade for this module is the result of the following individual performances during the courses and other academic activities:

75% – Oral consultation on the matters of the courses at the end of term, under consideration of performances during laboratory courses as a bonus.

25% – Result of the concept, written preparation and the project paper as well as the final talk.

9. Duration of Module

The module can be completed in one semester(s).

10. Number of Participants

60

11. Enrolment Procedures

No prior registration required.

12. Recommended Reading, Lecture Notes

Lecture notes available in paper form? yes no **X**

If yes, where can they be purchased?

Lecture notes in paper form are sometimes made available during class.

Lecture notes available in electronic form? yes **X** no

If yes, please specify web address: <http://www.qu.t-labs.tu-berlin.de/> and
<http://www.deutsche-telekom-laboratories.de/~srahul/>

Recommended Reading:

13. Other Information

The topics of the module can serve as a foundation of a diploma, bachelor, or master thesis in the area.