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**Modulbezeichnung:** **Laborpraktikum Image and Video Compression (PrIVC)** **2.5 ECTS**  
 (Lab Course Image and Video Compression)

Modulverantwortliche/r: Christian Herglotz

Lehrende: Kristian Fischer

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Startsemester: SS 2022

Dauer: 1 Semester

Turnus: jährlich (SS)

Präsenzzeit: 45 Std.

Eigenstudium: 30 Std.

Sprache: Englisch

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### Lehrveranstaltungen:

The content of this lab course is closely connected to the lecture Image and Video Compression (IVC) (Link)

Laborpraktikum Image and Video Compression (SS 2022, Praktikum, 3 SWS, Anwesenheitspflicht, Christian Herglotz et al.)

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### Empfohlene Voraussetzungen:

Das Praktikum Image and Video Compression wendet sich an Studierende aus den Studiengängen EEI, IuK und CE, die die Vorlesung Bild- und Videocodierung (Image and Video Coding) im gleichen Semester hören oder bereits gehört haben.

The lab course Image and Video Compression is suited for students from the field of study in EEI, IuK, WIng, ASC, CME, and CE, who participate in the lecture Image and Video Compression in the current summer semester or who have already attended the lecture.

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### Inhalt:

- Einführung in die Programmierumgebung MATLAB
- Realisierung der Verarbeitungsblöcke von Videocodern
- Aufbau eines Videocodecs und optionale Erweiterungen
- Durchführung eines subjektiven Vergleichs verschiedener Videocodecs
- Präsentation und kritische Beurteilung der Ergebnisse

#### Content

- Introduction to MATLAB
- Implementation of the single video codec processing blocks
- Integration into the video codec pipeline, tests, and extensions
- Participation in a subjective video test of selected implementations
- Presentation and discussion of the achieved results.

### Lernziele und Kompetenzen:

Die Studierenden

- erzeugen ein funktionsfähiges Programmsystem mit der Programmierumgebung MATLAB,
- beurteilen die Funktionsblöcke von Video-Codern,
- gestalten ihren eigenen Videocodec und entwickeln dazu von ihnen selbst gewählte optionale Erweiterungen,
- bewerten die von ihnen realisierten Videocodecs durch einen subjektiven Vergleich,
- reflektieren den Lernprozess während des Praktikums.

#### Learning Targets and Skills:

The students

- create a fully functional program using the programming environment MATLAB,
- evaluate the processing blocks of a typical video codec,
- design their own video codec and enhance it by extensions of their choice,
- evaluate their implemented video codecs in a subjective comparison,
- reflect upon the methods conveyed during the laboratory.

### Literatur:

Das Skriptum Praktikum Image and Video Compression wird in der Einführungsveranstaltung ausgegeben.

The lab course notes will be distributed during the introductory meeting.

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### Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

- [1] **Advanced Signal Processing & Communications Engineering (Master of Science)**  
(Po-Vers. 2016w | TechFak | Communications Engineering (Master of Science) | Gesamtkonto | Wahlpflichtmodule | Technical Lab Courses | Laborpraktikum Image and Video Compression)
- [2] **Advanced Signal Processing & Communications Engineering (Master of Science)**  
(Po-Vers. 2020w | TechFak | Communications Engineering (Master of Science) | Gesamtkonto | Technical Lab Courses | Laborpraktikum Image and Video Compression)
- [3] **Advanced Signal Processing & Communications Engineering (Master of Science)**  
(Po-Vers. 2021w | TechFak | Communications Engineering (Master of Science) | Gesamtkonto | Technical Lab Courses | Laborpraktikum Image and Video Compression)
- [4] **Communications and Multimedia Engineering (Master of Science)**  
(Po-Vers. 2011 | TechFak | Communications and Multimedia Engineering (Master of Science) | Gesamtkonto | Wahlpflichtmodule | Praktika | Laborpraktikum Image and Video Compression)
- [5] **Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)**  
(Po-Vers. 2009 | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science) | Studienrichtungen | Studienrichtung Informationstechnik | Laborpraktika Informationstechnik | Laborpraktikum Image and Video Compression)
- [6] **Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)**  
(Po-Vers. 2017w | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science) | Studienrichtung Informationstechnik | Laborpraktika Informationstechnik | Laborpraktikum Image and Video Compression)
- [7] **Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)**  
(Po-Vers. 2019w | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science) | Gesamtkonto | Studienrichtung Informationstechnik | Laborpraktika Informationstechnik | Laborpraktikum Image and Video Compression)
- [8] **Elektrotechnik, Elektronik und Informationstechnik (Master of Science)**  
(Po-Vers. 2015s | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Master of Science) | Gesamtkonto | Studienrichtung Informationstechnik | Hauptseminar und Laborpraktikum Informationstechnik | Laborpraktikum Image and Video Compression)
- [9] **Information and Communication Technology (Master of Science)**  
(Po-Vers. 2019s | TechFak | Information and Communication Technology (Master of Science) | Gesamtkonto | Praktikum/Projektarbeit, Seminar, Masterarbeit, Forschungsprojekt | Praktikum oder Projektarbeit | Laborpraktikum Image and Video Compression)
- [10] **Informations- und Kommunikationstechnik (Bachelor of Science)**  
(Po-Vers. 2007 | TechFak | Informations- und Kommunikationstechnik (Bachelor of Science) | Wahlpflichtmodule, Wahlmodule, Seminar, Praktikum | Praktikum oder Projektarbeit | Laborpraktikum Image and Video Compression)
- [11] **Informations- und Kommunikationstechnik (Bachelor of Science)**  
(Po-Vers. 2009 | TechFak | Informations- und Kommunikationstechnik (Bachelor of Science) | Gesamtkonto | Wahlpflichtmodule, Wahlmodule, Seminar, Praktika, Bachelorarbeit | Praktikum oder Projektarbeit | Laborpraktikum Image and Video Compression)
- [12] **Informations- und Kommunikationstechnik (Master of Science)**  
(Po-Vers. 2016s | TechFak | Informations- und Kommunikationstechnik (Master of Science) | Gesamtkonto | Wahlbereiche, Praktika, Seminar, Masterarbeit | Praktikum oder Projektarbeit | Laborpraktikum Image and Video Compression)
- [13] **Mechatronik (Master of Science)**  
(Po-Vers. 2012 | TechFak | Mechatronik (Master of Science) | Mechatronik (Studienbeginn bis 30.09.2020) | Gesamtkonto | M5 Hochschulpraktika | M5 Hochschulpraktika | Laborpraktikum Image and Video Compression)
- [14] **Wirtschaftsingenieurwesen (Bachelor of Science)**  
(Po-Vers. 2009 | TechFak | Wirtschaftsingenieurwesen (Bachelor of Science) | Studienrichtung Informations- und Kommunikationssysteme | weiterer Bachelorprüfungen | Ingenieurwissenschaftlicher Bereich | Wahlbereich | Hochschulpraktikum | Laborpraktikum Image and Video Compression)
- [15] **Wirtschaftsingenieurwesen (Bachelor of Science)**  
(Po-Vers. 2018w | TechFak | Wirtschaftsingenieurwesen (Bachelor of Science) | Studienrichtung Elektrotechnik (Studienbeginn ab 01.10.2018) | Gesamtkonto | Technische Wahlmodule und Hochschulpraktikum | Hochschulpraktikum Informationstechnik | Laborpraktikum Image and Video Compression)

[16] **Wirtschaftsingenieurwesen (Master of Science)**

(Po-Vers. 2009 | TechFak | Wirtschaftsingenieurwesen (Master of Science) | Masterstudiengang Wirtschaftsingenieurwesen (bis 30.09.2018) | Gesamtkonto | Ingenieurwissenschaftliche Studienrichtungen | Hochschulpraktikum Studienrichtung Informations- und Kommunikationssysteme | Laborpraktikum Image and Video Compression)

[17] **Wirtschaftsingenieurwesen (Master of Science)**

(Po-Vers. 2018w | TechFak | Wirtschaftsingenieurwesen (Master of Science) | Masterstudiengang Wirtschaftsingenieurwesen (Studienbeginn ab 01.10.2018) | Gesamtkonto | Studienrichtung Elektrotechnik | Technische Wahlmodule und Hochschulpraktikum | Hochschulpraktikum Studienrichtung Elektrotechnik - Informationstechnik | Laborpraktikum Image and Video Compression)

[18] **Wirtschaftsingenieurwesen (Master of Science)**

(Po-Vers. 2021w | TechFak | Wirtschaftsingenieurwesen (Master of Science) | Masterstudiengang Wirtschaftsingenieurwesen Studienrichtung Elektrotechnik (Studienbeginn ab 01.10.2021) | Studienrichtung Elektrotechnik | Technische Wahlmodule und Hochschulpraktikum | Hochschulpraktikum Studienrichtung Elektrotechnik - Informationstechnik | Laborpraktikum Image and Video Compression)

**Studien-/Prüfungsleistungen:**

Laborpraktikum Image and Video Compression (Prüfungsnummer: 76511)

Studienleistung, Praktikumsleistung

weitere Erläuterungen:

The lab course comprises ten sessions of four hours plus two sessions of two hours, which include 7 work packages, a subjective test, and a final presentation. Each work package is described in the lab course notes and consists of one or two sessions, the dates for which will be announced before the registration opens. Besides, each work package requires a preparation in written form and will be checked and reviewed (pass/fail) before the start of each session. During each of the ten mandatory lab sessions, the students are required to work on programming tasks, which will be reviewed at the end of each session (pass/fail). After these ten programming sessions, a working video codec has to be handed in. Besides, the students have to participate a subjective test, where the codec results are evaluated. In the last session, each video codec has to be presented by the students. A certificate confirming the successful participation in the laboratory is received if all work packages have been sufficiently prepared and implemented, if the results of all work packages have been combined into a functional and running video codec which is suitable for subjective testing, if the subjective video test has been participated in, and if the final video codec has been presented during the final presentation.

Prüfungssprache: Englisch

Erstablingung: SS 2022, 1. Wdh.: WS 2022/2023

1. Prüfer: André Kaup

Laborpraktikum Multimediakommunikation (Prüfungsnummer: 76501)

(englische Bezeichnung: Laboratory course: Multimedia Communication)

Studienleistung, Praktikumsleistung

weitere Erläuterungen:

The lab course comprises ten sessions of four hours plus two sessions of two hours, which include 7 work packages, a subjective test, and a final presentation. Each work package is described in the lab course notes and consists of one or two sessions, the dates for which will be announced before the registration opens. Besides, each work package requires a preparation in written form and will be checked and reviewed (pass/fail) before the start of each session. During each of the ten mandatory lab sessions, the students are required to work on programming tasks, which will be reviewed at the end of each session (pass/fail). After these ten programming sessions, a working video codec has to be handed in. Besides, the students have to participate a subjective test, where the codec results are evaluated. In the last session, each video codec has to be presented by the students. A certificate confirming the successful participation in the laboratory is received if all work packages have been sufficiently prepared and implemented, if the results of all work packages have been combined into a functional and running video codec which is suitable for subjective testing, if

the subjective video test has been participated in, and if the final video codec has been presented during the final presentation.

Prüfungssprache: Englisch

Erstablingung: SS 2022, 1. Wdh.: WS 2022/2023

1. Prüfer: André Kaup

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