

## BK121 - Embedded Systems / Internet of Things (IoT) AG (Engl)

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General information	
<b>Module Code</b>	BK121
<b>Unique Identifier</b>	EmbedSysInte-01-BA-M
<b>Module Leader(s)</b>	Prof. Dr. Patz, Ralf (ralf.patz@haw-kiel.de)
<b>Lecturer(s)</b>	Prof. Dr. Acker, Wolfram (wolfram.acker@haw-kiel.de) Prof. Dr. Patz, Ralf (ralf.patz@haw-kiel.de)
<b>Offered in Semester</b>	Sommersemester 2025
<b>Module duration</b>	1 Semester
<b>Occurrence frequency</b>	Regular
<b>Module occurrence</b>	In der Regel jedes Semester
<b>Language</b>	Englisch
<b>Recommended for international students</b>	Yes
<b>Can be attended with different study programme</b>	Yes

Curricular relevance (according to examination regulations)
Study Subject: B.Eng. - E - Elektrotechnik (PO 2017, V3) Module type: Wahlmodul Semester: 6
Study Subject: B.Eng. - E - Elektrotechnik (PO 2023, V4) Module type: Wahlmodul Semester: 6
Study Subject: B.Eng. - Me (PO 2023) - Mechatronik (PO 2023, V4) Module type: Wahlmodul Semester: 4, 6
Study Subject: B.Eng. - Me (PO 2024) - Mechatronik (PO 2024, V5) Module type: Wahlmodul Semester: 4, 6
Study Subject: B.Eng. - Ming - Medieningenieur/-in (PO 2018, V1 + PO 2021, V2) Module type: Wahlmodul Semester: 4, 6
Study Subject: B.Eng. - Wing - Wirtschaftsingenieurwesen - Elektrotechnik (PO 2017, V1) Module type: Wahlmodul Semester: 6
Study Subject: B.Eng. - Wing - Wirtschaftsingenieurwesen - Elektrotechnik (PO 2023, V2) Module type: Wahlmodul Semester: 6
Study Subject: B.Sc. - INF - Informatik (PO 2021, V1) Module type: Wahlmodul Semester: 4, 6
Study Subject: B.Sc. - INI - Informationstechnologie (PO 2017, V1) Module type: Wahlmodul Semester: 4
Study Subject: B.Sc. - WINF - Wirtschaftsinformatik (6 Sem.) Module type: Wahlmodul Semester: 4

Study Subject: B.Sc. - WINF 7 Sem. - Wirtschaftsinformatik (7 Sem.)  
Module type: Wahlmodul  
Semester: 6

### Qualification outcome

*Areas of Competence: Knowledge and Understanding; Use, application and generation of knowledge; Communication and cooperation; Scientific self-understanding / professionalism.*

The students

- will understand the principles of embedded systems based on microcontrollers and single-board computer.
- will be able to evaluate products and systems based on embedded systems.
- will work in teams on tasks and will be able to defend and argue their positions against the other team members.

### Content information

<b>Content</b>	Embedded systems are used in most electronic systems nowadays. The term "Internet of Things" (IoT) has been coined as they get increasingly networked (Ethernet, Wifi, Bluetooth, etc.) via the Internet. This module exposes the students to embedded systems as well as to the IoT. The concepts and tools are conveyed via project work using different embedded system platforms (e.g. Arduino, Raspberry Pi, ARM Mikrocontroller, or similar). Different approaches are used in order to take into account the different levels of students.
<b>Literature</b>	<ul style="list-style-type: none"> <li>• Charalampos Doukas, Building Internet of Things with the Arduino, CreateSpace Independent Publishing Platform, 2012.</li> <li>• Charles Bell, Beginning Sensor Networks with Arduino and Raspberry Pi, Apress; Auflage: 2013</li> <li>• E.F. Engelhardt, Sensoren am Raspberry Pi, Franzis Verlag GmbH, 2014.</li> <li>• Texas Instruments Launchpad, <a href="http://www.ti.com/launchpad">www.ti.com/launchpad</a></li> </ul>

### Teaching formats of the courses

Teaching format	SWS
Labor	4

### Workload

<b>Number of SWS</b>	4 SWS
<b>Credits</b>	5,00 Credits
<b>Contact hours</b>	48 Hours
<b>Self study</b>	102 Hours

### Module Examination

<b>Examination prerequisites according to exam regulations</b>	None
<b>BK121 - Projektbezogene Arbeiten</b>	Method of Examination: Projektbezogene Arbeiten Weighting: 100% wird angerechnet gem. § 11 Absatz 2 PVO: No Graded: Yes

<b>Miscellaneous</b>	
<b>Miscellaneous</b>	<p>The module is project orientated and offered every semester. This allows the student to work on the project for a longer time period. It is therefore possible, and encouraged, to enrol into the module for more than one semester. In this case the module is limited to a total of 5 CP.</p> <p>The attendance of the laboratory sessions is compulsory.</p>