## Automotive Electronics and Sensors (English)

| Mod                             | Module Title                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| Module Leader<br>Teaching Staff |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Prof. Dr. sc. Techn. Klaus Thelen<br>Prof. Dr. Klaus Thelen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                         |                                                                                                                                                                                                     |                                                                                                                                                                                               |                                  |                                                                         |     |
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| 1                               | Lecture: 2 h/<br>Seminar: 1 h/<br>Practical                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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                                                          | Approx. Number o<br>Participants |                                                                         |     |
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                                                          | Semin<br>Practi                  | Lecturemax. 150<br>bzw. 120Seminar15Practical<br>Coursemax. 15          |     |
|                                 | <ul> <li>understood the specific characteristics of the most important sensors and actuators and are able to select the appropriate components for any given problem.</li> <li>learned about the relevant vehicle networks and can plan and test the communication of the components.</li> <li>gathered insight into aspects concerning alternative drive technologies (electric traction) and development processes.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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|                                 | c<br>g                                                                                                                                                                                                                                                                                                                                                                                                                           | earned about th<br>omponents.<br>athered insight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| 3                               | Conter<br>T<br>T<br>T<br>T<br>T<br>P                                                                                                                                                                                                                                                                                                                                                                                             | earned about the omponents.<br>athered insight evelopment pro-<br>nts<br>The fundament<br>The special chat<br>The function are<br>The component rocesses described.                                                                                                                                                                                                                                                                                                                                                                                               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units, s                                                    | commur<br>(electric              | nication of the<br>e traction) and<br>nd actuators                      |     |
|                                 | Conter<br>T<br>T<br>T<br>T<br>P<br>o<br>Teach                                                                                                                                                                                                                                                                                                                                                                                    | earned about the omponents. athered insight evelopment provide the fundament of the fundament of the function are the function are the component processes describes the function are function are the component of the function are the function ar | and rocess<br>t into a<br>rocess<br>cals of<br>rracter<br>ad strut<br>ts of e<br>ribing<br>netic c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | evant v<br>aspects<br>ses.<br>electric<br>clectric<br>devel<br>compat                                                   | ehicle network<br>s concerning alt<br>onic component<br>of automotive e<br>of vehicle elect<br>c powertrains<br>opment, produ<br>tibility (EMC)                                                     | o for any given problem.<br>s and can plan and test the<br>cernative drive technologies<br>nts and circuits<br>electronics, control units, s<br>rical systems<br>ction and test of the releva | commur<br>(electric              | nication of the<br>e traction) and<br>nd actuators                      |     |
| 4                               | Conter<br>Conter<br>T<br>T<br>T<br>T<br>P<br>o<br><b>Teach</b><br>Lectur                                                                                                                                                                                                                                                                                                                                                         | earned about the omponents.<br>athered insight<br>evelopment pro-<br><b>nts</b><br>The fundament<br>The special char<br>The function ar<br>The componen<br>rocesses described<br>f Electromagric<br><b>ing Methods</b><br>e with an according                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | t into a rocess cals of a structure relevant to the structure ribing netic compared to the structure relevant to the struc | evant v<br>aspects<br>ses.<br>electric<br>clectric<br>devel<br>compat                                                   | ehicle network<br>s concerning alt<br>onic component<br>of automotive e<br>of vehicle elect<br>c powertrains<br>opment, produ<br>tibility (EMC)                                                     | o for any given problem.<br>s and can plan and test the<br>cernative drive technologies<br>nts and circuits<br>electronics, control units, s<br>rical systems<br>ction and test of the releva | commur<br>(electric              | nication of the<br>e traction) and<br>nd actuators                      |     |
| 4                               | Conter<br>Conter<br>T<br>T<br>T<br>T<br>T<br>P<br>o<br>Conter<br>Lectur<br>Fundar                                                                                                                                                                                                                                                                                                                                                | earned about the omponents. athered insight evelopment provide the fundament provide the function are the function are the function are the component processes described felectromager felectromager ing Methods e with an account-Related Methods of electromager processes of the function are the f | t into a rocess cals of a strutts of e ribing netic c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | evant v<br>aspects<br>ses.<br>electric<br>clectric<br>devel<br>compat                                                   | ehicle network<br>s concerning alt<br>onic component<br>of automotive e<br>of vehicle elect<br>c powertrains<br>opment, produ<br>tibility (EMC)<br>seminar and pro<br>equisites                     | oject work.                                                                                                                                                                                   | commur<br>(electric<br>ensors an | nication of the<br>e traction) and<br>nd actuators<br>ponents Influenc  |     |
| 3<br>4<br>5<br>6                | Conter<br>Conter<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T<br>T                                                                                                                                                                                                                                                                                                                  | earned about the omponents. athered insight evelopment provide the fundament provide the function are the function are the function are the component processes described felectromager felectromager ing Methods e with an account-Related Methods of electromager processes of the function are the f | t into a<br>rocess<br>als of<br>racter<br>d struts of e<br>ribing<br>netic c<br>ompar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | evant v<br>aspects<br>ses.<br>Felectric<br>clectric<br>clectric<br>devel<br>compation<br>aying s<br>e Prere<br>als of r | ehicle network<br>s concerning alt<br>onic component<br>of automotive e<br>of vehicle elect<br>c powertrains<br>opment, produ<br>tibility (EMC)<br>seminar and pro<br>equisites<br>cering and elect | oject work.                                                                                                                                                                                   | commur<br>(electric<br>ensors an | nication of the<br>e traction) and<br>nd actuators<br>ponents Influence |     |

| 7  | Type of Exams                                                                                                       |                        |  |  |  |  |  |
|----|---------------------------------------------------------------------------------------------------------------------|------------------------|--|--|--|--|--|
|    | Written exam (70%, 120 minutes), project work with presentation (30%)                                               |                        |  |  |  |  |  |
| 8  | Prerequisite for the Granting of Credits                                                                            |                        |  |  |  |  |  |
|    | Successful passing of the module exam                                                                               |                        |  |  |  |  |  |
| 9  | This Module Appears in:                                                                                             |                        |  |  |  |  |  |
|    | Course of Studies                                                                                                   | Status                 |  |  |  |  |  |
|    | Angewandte Informatik_BPO2010                                                                                       | Elective Module        |  |  |  |  |  |
|    | Angewandte Informatik_BPO2010                                                                                       | Elected Specialization |  |  |  |  |  |
|    | Angewandte Informatik_BPO2017                                                                                       | Elective Module        |  |  |  |  |  |
|    | Mechatronik_BPO2013                                                                                                 | Elective Module        |  |  |  |  |  |
|    | Mensch-Technik-Interaktion_BPO2013 Elective Module                                                                  |                        |  |  |  |  |  |
|    | Mensch-Technik-Interaktion_BPO2017 Elective Module                                                                  |                        |  |  |  |  |  |
|    | Modules in English at HRW                                                                                           | Elected Specialization |  |  |  |  |  |
| 10 | Weighting of Grade in Relationship to Final Grade                                                                   |                        |  |  |  |  |  |
|    | Weighting equals the proportion of module credits in relationship to the total number of grade-<br>relevant credits |                        |  |  |  |  |  |
| 11 | Additional Information / Literature                                                                                 |                        |  |  |  |  |  |
|    | Konrad Reif: 'Automobilelektronik: Eine Einführung für Ingenieure' Springer, Vieweg Dez 2014                        |                        |  |  |  |  |  |
|    | Manfred Krüger: "Grundlagen der Kraftfahrzeugelektronik, Schaltungstechnik" Hanser Verlag,<br>München               |                        |  |  |  |  |  |
|    | Najamuz Zaman: "Automotive Electronics Design Fundamentals" Springer Verlag 2015                                    |                        |  |  |  |  |  |
|    | William B. Ribbens: "Understanding Automotive Electronics" Elsevier 2012                                            |                        |  |  |  |  |  |