Infrastructure Engineering and Management  RESE M 6

Relevance for ResEngin curriculum  compulsory | Administration | Contact
| | ResEngin Office | res.eng@bgu.uka.de

Term(s) offered  2nd term (Summer term Apr–Sep)
Duration | Cycle  1 term; every other year
Language of instruction  English
Prerequisites  Bachelor

Module coordinator  Roos, Dr.-Ing. Dr.h.c. (Sofia) Ralf; Ord., ISE [Modulverantwortlicher]
Learning outcomes  Description see p. 2.
Literature / Course materials  Reference list see p. 3.

Basis for module(s)  M 7 Integrated Projects
M MSc Masterarbeit
Interesction with module(s)  n.a.

Lecture courses (training mode)  19630 Construction Management (lecture)  1.5 CP  1 WCH
19631 Facility Management (lecture)  1.5 CP  1 WCH
19623 Road Infrastructure Management (lecture, excursion)  3.0 CP  2 WCH

SUM  6.0 CP  4 WCH

Workload specification (30 work hours → 1 CP acc. to ECTS)  6 x 30 h  180 h
Lecture Phase:  Contact hours  42 h
Self instruction hours  84 h
Exam Phase:  Self instruction hours  54 h

Module examination(s) (mode | scope | weighting)  “Infrastructure Engineering & Management” written | 120 min | 6.0/6.0 CP

Lecturers (in alphabetic order)  – Bahr, Dr.-Ing. Carolin; TMB
– Hess, Dr.-Ing. Rainer; Durth Roos Consulting GmbH
– Lenneerts, Dr.-Ing. Kunibert, Univ.-Prof.; TMB
– Roos, Dr.-Ing. Dr.h.c. (Sofia) Ralf; Ord.; ISE

Individual lecture courses  Descriptions + Recommended background knowledge see pp. 4.
Module 6: "Infrastructure Engineering and Management" (cont.)

Module topic

Various roles of stakeholders in the field of Facility Management, holistic thinking over complete building life cycle. Those who provide road infrastructures will need to consider life cycle aspects and long-term management.

Learning outcomes

**Disciplinary knowledge**

- **concepts, theories & definitions**
  Management and project management, risk in management projects, relations between cost, time and quality.
  Technical, infrastructural and commercial principles of Facility Management; Public Private Partnership (PPP).
  Permission and design process for road infrastructures, vehicle road interaction and consequences for the structural design, quality assurance.

- **subject matter (factual data, examples)**
  Project management in civil construction.
  International definitions of FM, FM Associations, regulations and guidelines of FM; technical Facility Management; benchmarking in real estate management; contracting; sustainability in Real Estate Management.
  Planning, geometric design, structural design and construction of road infrastructures with special attention to recycled materials.

- **methods & procedures**
  Project phases, project organization; cost management, quality management.
  Economic comparison, different management methods, company organizations, strategic Facility Management—a management discipline for building-related secondary processes that supports all primary processes—the real estate life cycle incl. lifecycle costs of a building (office, hospital, school etc.).
  Institutional organization and implementation of road maintenance and pavement management systems including infrastructure assessment.

**Professional skills**

- To gain expertise in analytic project thinking.
- To gain expertise in analyzing processes and optimizing strategies for various secondary processes, as well as in cost minimization and reduction of resource consumption.
- To analyse complex interrelationships and life cycle approach for the management of road infrastructures. To gain advanced expertise in road construction and technical infrastructure assessment combined with competence in infrastructure management. To handle the life cycle of road infrastructures.

**Personal competence**

- Collaborative engineering. To get ready for work in interdisciplinary teams. Time management.
Module 6: "Infrastructure Engineering and Management" (cont.)

Literature/ Course material


Richtlinien für die Standardisierung des Oberbaus von Verkehrsflächen (RStO 2001) Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV) Nr. 499 FGSV-Verlag


### Module 6

**Infrastructure Engineering and Management**

#### Course

**Construction Management**

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<thead>
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<th>KIT Lecture ID</th>
<th>19630</th>
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<td>Term(s)</td>
<td>2nd term (summer)</td>
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<td>Language</td>
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**Workload specification**

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<th>LECTURE PHASE</th>
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<td>Self instruction</td>
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**Contact**

- N.N.; TMB

**Course topic**

Learning about a time- and cost-efficient use of resources in projects.

**Recommended background knowledge**

n.a.

**Learning outcomes**

**Disciplinary knowledge**

- **concepts, theories & definitions**
  - management and project management, risk in management projects, relations between cost, time and quality.
- **subject matter (factual data, examples)**
  - project management in civil construction.
- **methods & procedures**
  - project phases, project organization; cost management, quality management.

**Professional skills**

To gain expertise in analytic project thinking.

**Personal competence**

Collaborative engineering. To get ready for work in interdisciplinary teams. Time management.

**Assessment specification**

- **written** 120 min = module exam "Infrastructure Engineering & Mgmt."
  - together with LV Road Infrastructure Mgmt & LV Facility Mgmt.
- **oral** ---
- **other** ---

* WCH = Weekly Contact Hours
Module 6

Infrastructure Engineering and Management

Course

Facility Management

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**Workload specification**

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**Contact**

carolin.bahr@kit.edu

**Lecturer(s)**
Lennerts, Dr.-Ing. Kunibert, Dipl.-Wi.-Ing., Prof.; TMB
Bahr, Dr.-Ing. Carolin; TMB

**Course topic**
Different roles of stakeholders in the area of Facility Management, holistic thinking over complete building life cycle.

**Recommended background knowledge**
Fundamentals of facility management.

**Learning outcomes**

**Disciplinary knowledge**
- concepts, theories & definitions
  - technical, infrastructural and commercial principles of Facility Management; Public Private Partnership (PPP).
- subject matter (factual data, examples)
  - international definitions of FM, FM Associations, regulations and guidelines of FM; technical Facility Management; benchmarking in real estate management; contracting; sustainability in Real Estate Management.
- methods & procedures
  - economic comparison, different management methods, company organizations, strategic Facility Management—a management discipline for building-related secondary processes that supports all primary processes—the real estate life cycle incl. lifecycle costs of a building (office, hospital, school etc.).

**Professional skills**
To gain expertise in analyzing processes and optimizing strategies for various secondary processes, as well as in cost minimization and reduction of resource consumption.

**Personal competence**
n.a.

**Assessment specification**
written 120 min = module exam "Infrastructure Engineering & Mgmt.” together with LV ‘Road Infrastr. Mgmt & LV Construction Mgmt
oral ---
other ---

* WCH = Weekly Contact Hours
### Course: Road Infrastructure Management

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#### Contact
matthias.zimmermann@kit.edu

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**Lecturer(s)**
Roos, Dr.-Ing. Dr.h.c. (Sofia) Ralf, Ord.; ISE  
Hess, Dr.-Ing. Rainer; Durth Roos Consulting GmbH

**Course topic**
Life cycle aspects and management needs in providing road infrastructures.

**Recommended background knowledge**
Fundamentals of applied mathematics, mechanics, economics.

**Disciplinary knowledge**
- **concepts, theories & definitions**  
  permission and design process for road infrastructures, vehicle road interaction and consequences for the structural design, quality assurance.
- **subject matter (factual data, examples)**  
  planning, geometric design, structural design and construction of road infrastructures with special attention to recycled materials.
- **methods & procedures**  
  institutional organization and implementation of road maintenance and pavement management systems including infrastructure assessment.

**Professional skills**
To analyse complex interrelationships and life cycle approach for the management of road infrastructures. To gain advanced expertise in road construction and technical infrastructure assessment combined with competence in infrastructure management. To handle the life cycle of road infrastructures.

**Personal competence**
n.a.

**Assessment specification**
written 120 min = module exam “Infrastructure Engineering & Mgmt.” together with LV Construction Mgmt. & LV Facility Mgmt.
oral ---
other ---

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* WCH = Weekly Contact Hours