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## **Software Engineering Distance Learning Program**

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**Fraunhofer IESE  
28th February 2006  
Visit Bosch**

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### **MSE Distance Learning Program**

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#### **Outline**

- Motivation
- MSE Distance Learning Program
- Benefits
- Costs
- Options for enrollment

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## Why is there a Need for Professional Distance Learning in SE? (1/2)

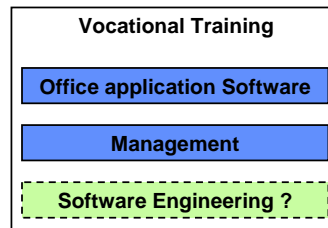
- Hardware-dominated product domains are turning into software-dominated ones (80% of innovations in automobiles via software)
- Traditional engineers without profound SE knowledge are developing software

In addition

- Increasing complexity of software
- Rising demand for secure/safe and high quality software in embedded systems
- Constant change and stream of new SE methods, techniques, and tools (e.g., software product lines, verification, automatic testing)

## Why is there a Need for Professional Distance Learning in SE? (2/2)

- Vocational training programs focus mostly on technology (e.g., office application software) and software skills (e.g., management, presentation)
- Software Engineering training is not addressed adequately (Software & Software Engineering as core competencies!)



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## International Distance Learning Program @ TU KL

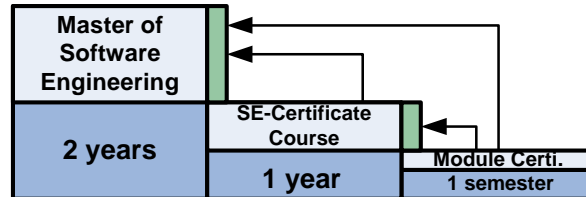
- The program reflects **the latest state-of-the-art in Software Engineering** for embedded systems.
- It is being developed by **international top experts** of the SE domain, who are both high-ranking researchers and recognized in industry because of their profound practical experiences.
- Students will earn **recognized degrees** and **certificates** by enrolling either in the **Master degree program** or in a **certificate course**, or by attending **single modules** in a part-time or full-time option.

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## Target Group

- Professional engineering work force
  - Automotive industry
  - Medical devices industry
  - Military installations (Ramstein/Kaiserslautern)
  - ...
- Equivalent of BS in Engineering & At least **two years or practical experience** in software development

### SE Distance Learning Program: In a Glance



The students may enroll

- in the Master degree program that comes with a 2-year part-time option (i.e., in parallel to a job) and a 1-year full-time option
- in a customized SE-certificate course that consist of 3-4 modules and receive a SE-certificate upon successful course completion
- or in a single module certificate.

### Key program characteristics

- 2 year part-time (or 15 months full-time)
- Cost: 12.000 EUR
- Credits: 60
- Effort: 1800 h (15h / week)
- Mode: Distance (except: exams & 1 long weekend per semester & 2-3 week project course in sem. 2/3 each)
  - Project course could be arranged @ company

## MSE Distance Learning Program

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### Learning Goals

- Fundamentals – understand and apply fundamental principles and basic concepts across all software development phases
- Develop large-scale software – understand the differences and challenges between software development in the small and software development in the large; learn how to systematically develop complex software by applying selected methods, techniques, and tools; understand the importance of dependability and hence explicitly consider correctness, reliability, availability, performance, security and safety as critical aspects of embedded software
- Manage projects – understand and elicitate the risks, estimate the projects costs, and assure the software quality by selecting the best available methods, techniques, and tools
- Critical thinking and decision making - analyze, evaluate, and synthesize information, take the right decision, and develop appropriate solutions to solve problems;
- Software Process – understand, define, apply, and improve a software processes based on reliable measurement data

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## MSE Distance Learning Program

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### Learning Goals

- Team work and Collaboration – work efficiently in teams in order to achieve common goals
- Communication – present and share information about software products, processes and related knowledge in a variety of forms with selected description techniques and
- Experience Management – package valuable lessons learned, models, processes, and software products for later reuse and perform continuous process improvement

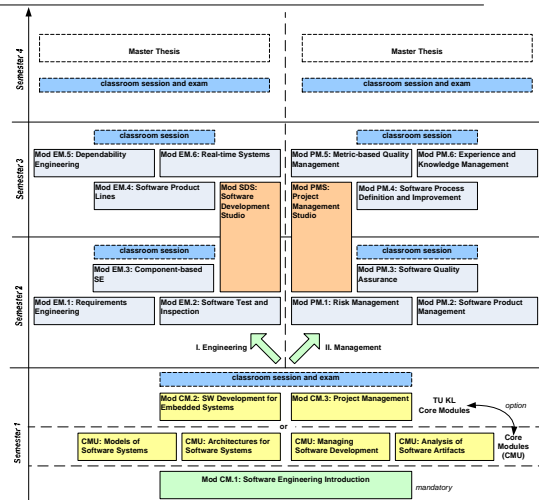
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## MSE Distance Learning Program

### Curriculum Structure

- The program consists of different modules that emphasize either engineering or management skills.
- Semester 1: 1 SE Introduction (mandatory) + 2 TU KL core modules **or** CMU core modules + exam
- Semester 2: 3 special modules (mandatory) + studio
- Semester 3: 3 special modules (mandatory) + studio
- Semester 4: Final exam + Master Thesis



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## MSE Distance Learning Program

### Benefits

- International program and online access to experts
- High-quality content
- Engineers acquire software engineering competencies
- Practical training in Software Development / Project Management Studio
- On-site classroom sessions with professional staff
- Customized programs and courses

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## MSE Distance Learning Program

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### Costs

- Enroll in the Technical University variant (12.000.-€)
- Enroll in the Carnegie Mellon University variant without CMU credits (20.000.-€)
- Enroll in the Carnegie Mellon University variant with CMU credits (30.000.-€)

This includes:

- Subscription costs of the university and access to the services of the university
- All learning materials and tutoring
- Coaching during the Software Development/Project Management Studio
- All classroom sessions with experts (excluding hotel and travel costs)
- Exams and fee for Master Thesis

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## MSE Distance Learning Program

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### Options for enrollment

- Bosch integrates single modules into their internal vocational training program
- Bosch signs-up groups of professional to the MSE distance learning program
- Bosch internally promotes the program and the students enroll on their own interest

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### **Questions to interested companies**

- General interest? Which option?
- Curriculum
  - Modules?
  - Lecturers?
- Payment (company, or ???)?
- Commitment (# students)?
- Participation in final development?
  - Resources?
  - Budget?