Module Description

Enterprise Computing

General Information

Number of ECTS Credits

3

Abbreviation

TSM_EntComp

Version

04. March 2013

Responsible of module

Karl Rege

Language

	Lausanne	Bern	Zürich
Instruction	☐ E ☐ F	☐ D ☐ E ☐ F	☒ D ☒ E
Documentation	☐ E ☐ F	☐ D ☐ E ☐ F	☐ D ☒ E
Examination	☐ E ☐ F	☐ D ☐ E ☐ F	☒ D ☒ E

Module category

☐ Fundamental theoretical principles

☒ Technical/scientific specialization module

☐ Context module

Lessons

☒ 2 lecture periods and 1 tutorial period per week

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Brief course description of module objectives and content

This module conveys to the master students the concepts to design, develop and integrate software in an enterprise environment, i.e. a professional environment with a dedicated IT department and a total organization head count usually above 500.

Specific to these environments are - several but not necessarily all - of the following characteristics:
- heterogeneous IT environment (HW, network, OSs, applications, …)
- mix of bought and inhouse developed applications
- high demands concerning reliability, performance and availability for business critical applications
- high volume and/or high performance data processing requirements
- external operation of applications and services, e.g. for support functions
- support organization and issue management
- integration need on different architecture level (GUI, service, data)
- centralized access control and user management
- provision of business key data by IT

Aims, content, methods

Learning objectives and acquired competencies

The student is sensitized for the underlying complexity and knows basics problems and solutions.
- The student can classify the applications in a typical IT environment from a various perspectives (business, technical, etc)
- The student understands various IT architectures and their characteristics (e.g. scalability, performance)
- The student is aware of the operational requirements of an enterprise IT and its technical and architectural implications
- The student knows how enterprise architectures can be systematically described and designed
- The student knows a the characteristics of a prototypical set of commercial applications (SAP, Siebel, Peoplesoft,…)
- The student knows the concepts of components and service oriented architectures
- The student knows the possibilities to integrate legacy (existing) systems

Contents of module with emphasis on teaching content

Role of IT and Typical Software Portfolio in an Enterprise (2 weeks - not consecutive)
- classification of software: e.g. core business vs support, function, applications
- make or buy decisions

- operational and development models
- SW lifecycle in enterprises- and dependency-management implications
- Characterization of sets of prototypical commercial applications (SAP, etc.) - hold at the end of the term

Technical Basis of Enterprise Computing (6 weeks)
- Concepts of Communication Infrastructures (1 week)
  - data marshalling (binary, textual)
  - remote object request vs. service/function invocation
  - lookup (e.g. Naming Service) and referencing (e.g. URL, IOR)
  - context piggybacking (security, transaction)
  - sample implementations: e.g. CORBA, SOAP, REST as a protocol, ProtoBuf
- Application Server Concepts (1 week)
  - components and containers
  - functional building blocks of application servers
  - cross cutting constraints/aspect oriented programming
  - code generation and MDA
  - SOA and REST architectures
  - conversation concept
  - sample implementation: e.g. EJB3, Spring and other frameworks
- Design Pattern for Enterprise Computing (1 week)
- Enterprise Search Services and Meta Directories (1 week)
  - enterprise search and ontology
  - meta data handling, meta dictonary,
  - sample implementations: e.g. LDAP, Lucene
- Operational Environment (2 weeks)
  - virtualization
  - clustering
  - storage area networks
  - introduction to high performance, high availability computer systems: clusters, rsm (remote shared memory), large scale distributed systems (grid, volunteer computing, peer-to-peer architectures), etc.
  - offline/batch processing

Development and Integration of Enterprise Computing (6 weeks)
- Development process (plan, design, test, monitoring, logging, profiling and deploy) (1 weeks)
- systems integration, application integration, enterprise integration, middleware, data integration / ETL, service integration /SOA, presentation layer integration / portal & mashups (3 weeks)
  - ETL, e.g. for BI
  - portals, mashups
  - service integration and SOA (service oriented architecture)
- Process Automation and Integration (1 week)
  - service orchestration, long-running transactions and compensation, business process execution languages (BPEL)
- Security Mechanisms (1 week)
  - user authentication, credential mapping
  - credential forwarding

Teaching and learning methods

Role of IT and Typical Software Landscape (2)

Technological Basis of Enterprise Computing (6 weeks)

Development and Application Integration (6 weeks)

Prerequisites, previous knowledge, entrance competencies

The students have working knowledge in
- OO-programming (C++, Java, or similar), basic design patterns (factory, façade, etc) and software development
- Networked, distributed and remote programming architecture (RPC, RMI, …)
- Operating systems basics
- Network Protocol (TCP/IP)

Literature

actual papers and script

Assessment

Certification requirements for final examinations (conditions for attestation)

80% exercises

Written module examination

Duration of exam :	120 minutes
Permissible aids:	open book